

**IBM**<sup>®</sup>

**7090 / 7094**

**GENERALIZED  
SORTING PROGRAM  
(729 FIXED LENGTH)**

**LOGIC DIAGRAMS**

**PREPARED BY  
CUSTOMER ENGINEERING EDUCATION  
POUGHKEEPSIE, NEW YORK**

**IBM CONFIDENTIAL**

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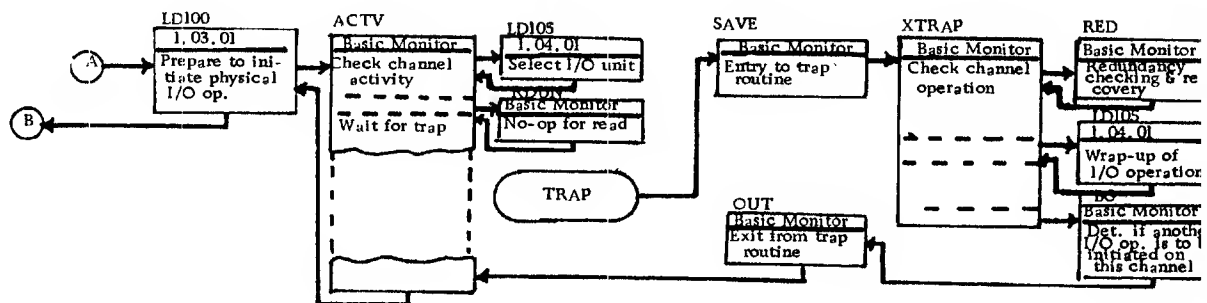
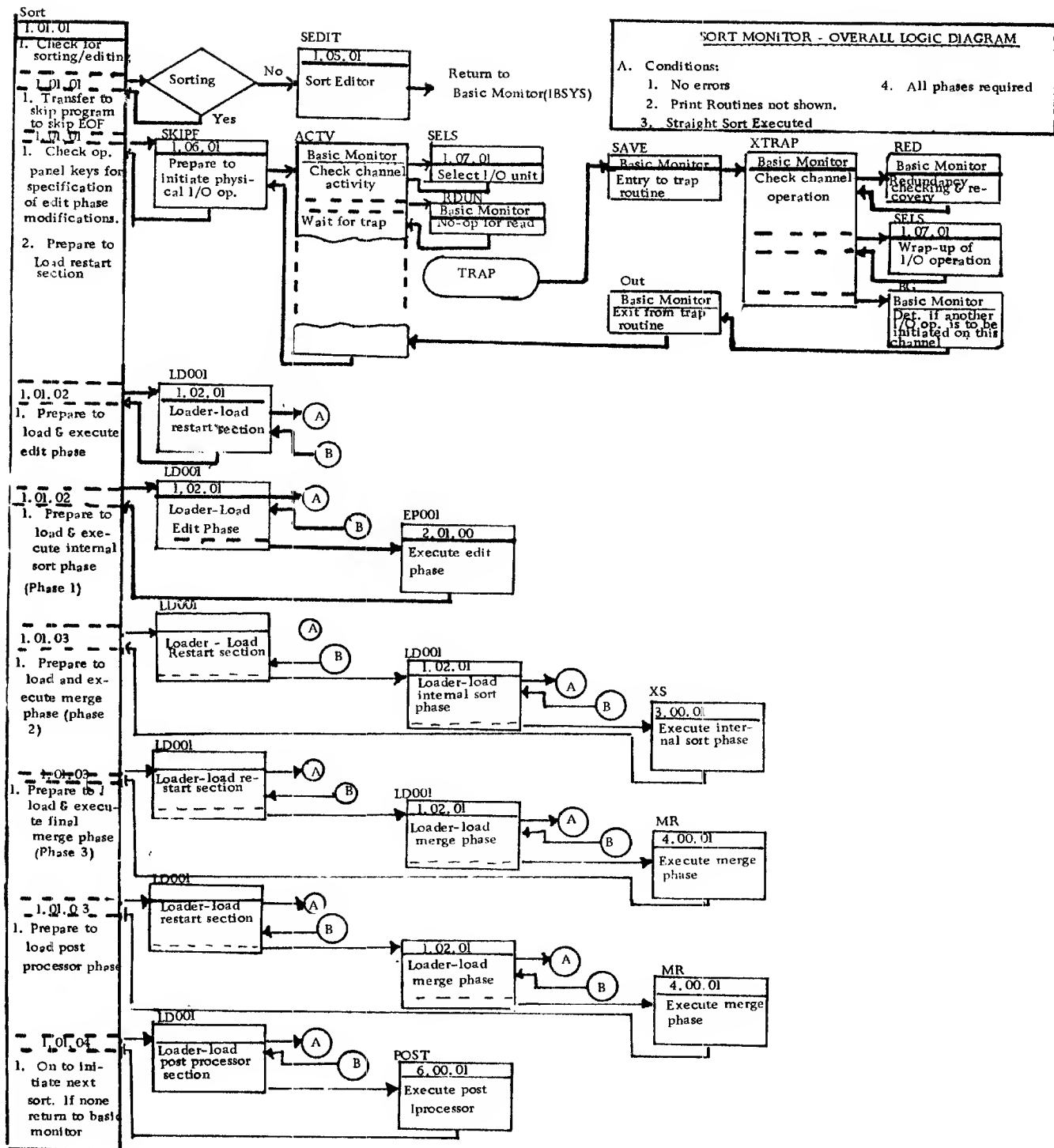
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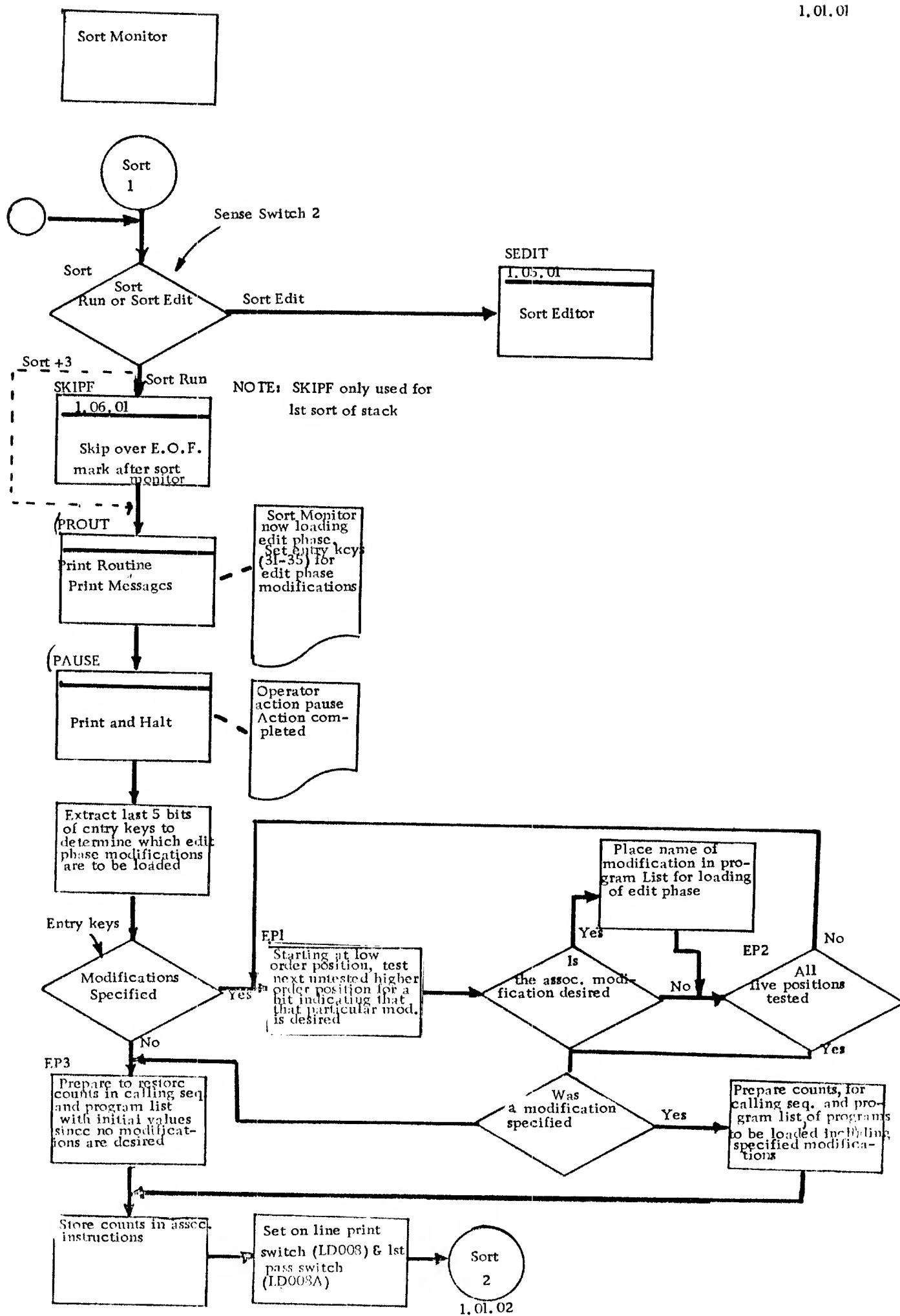
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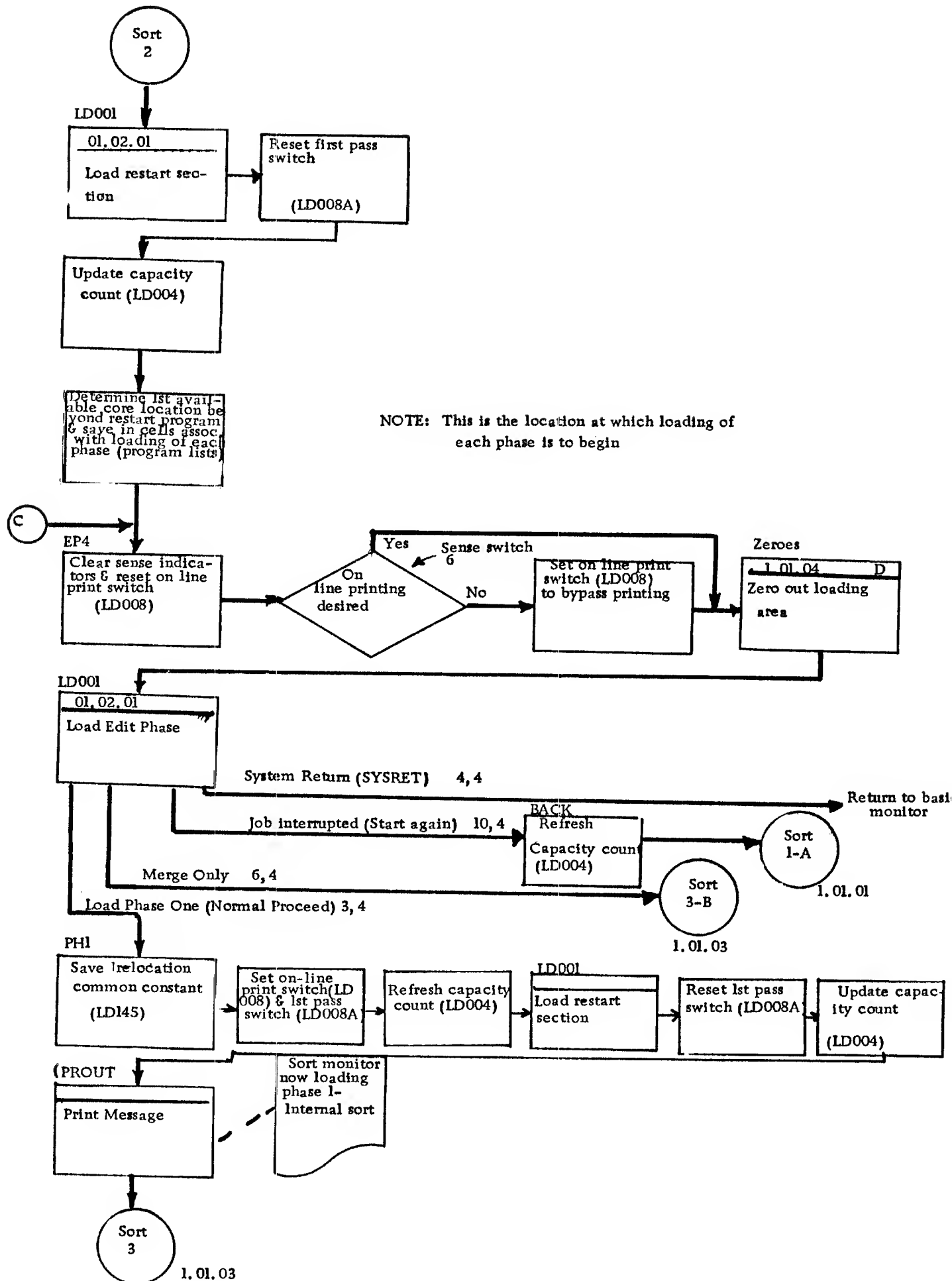
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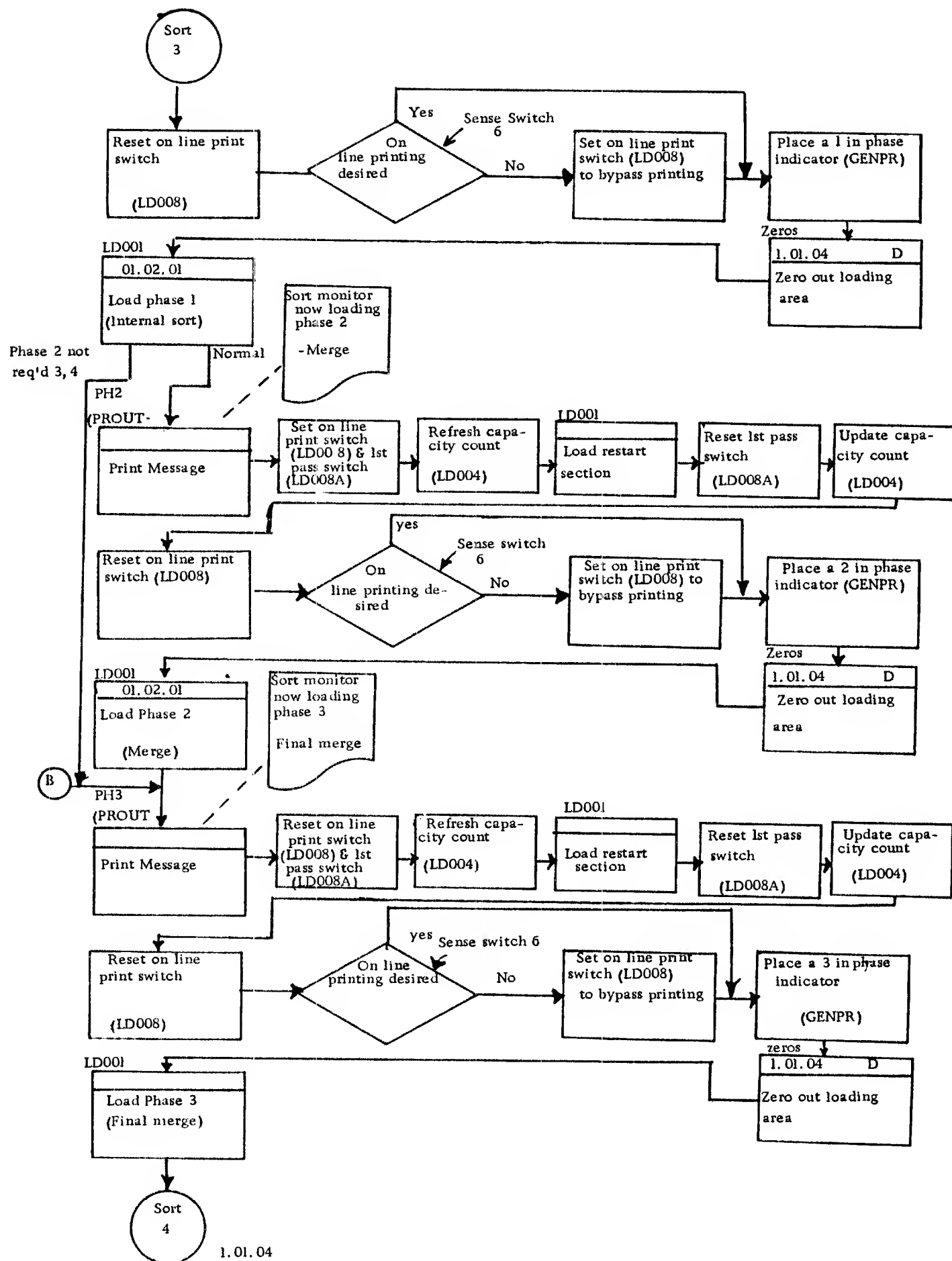
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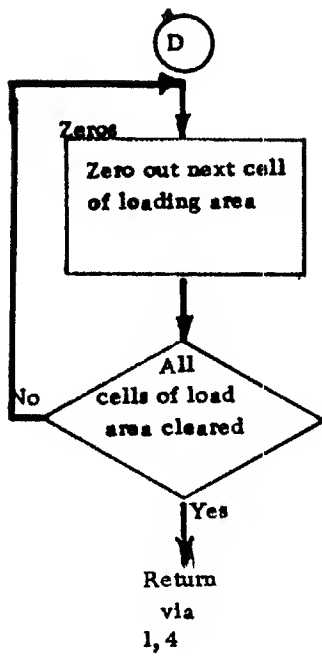
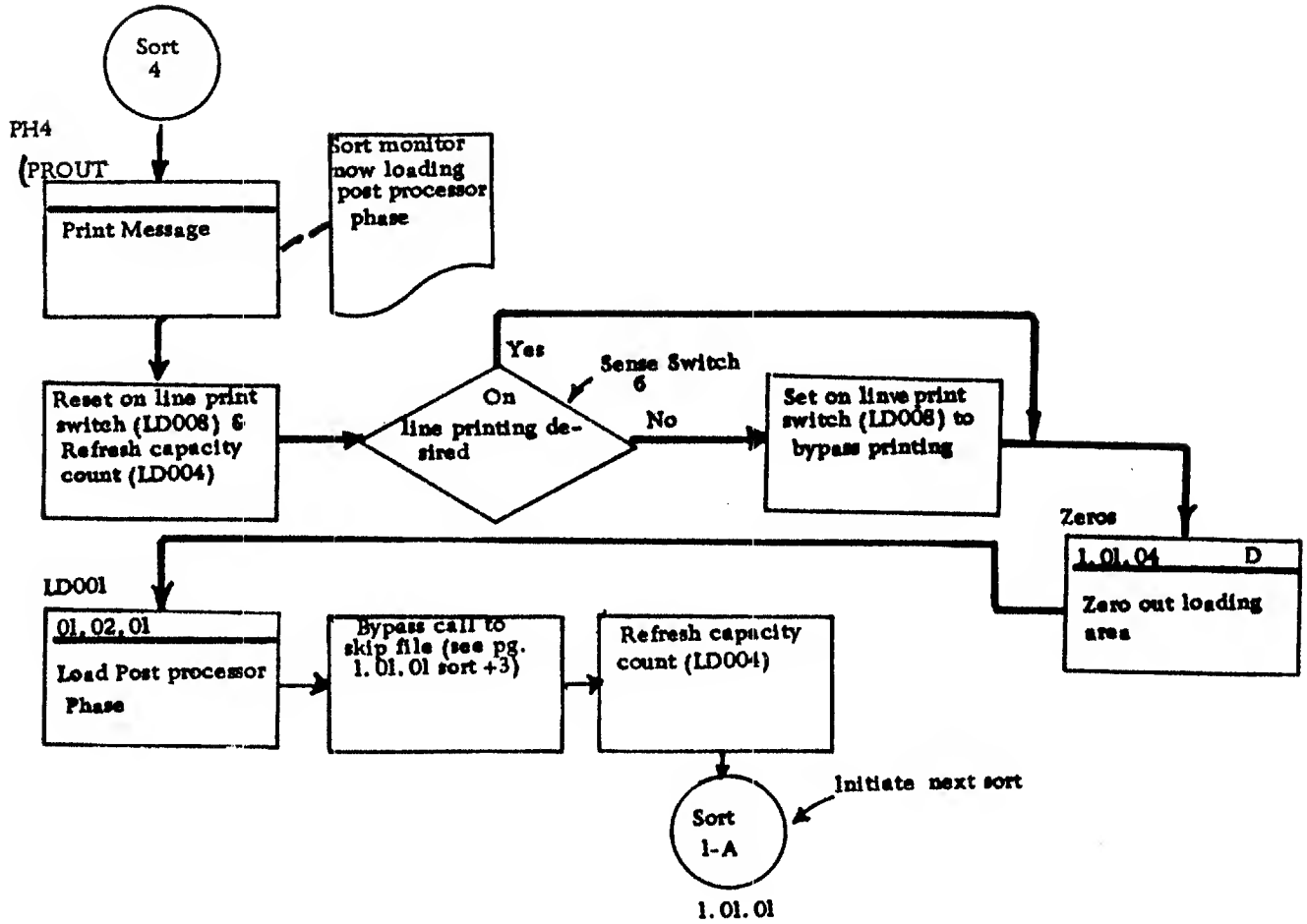
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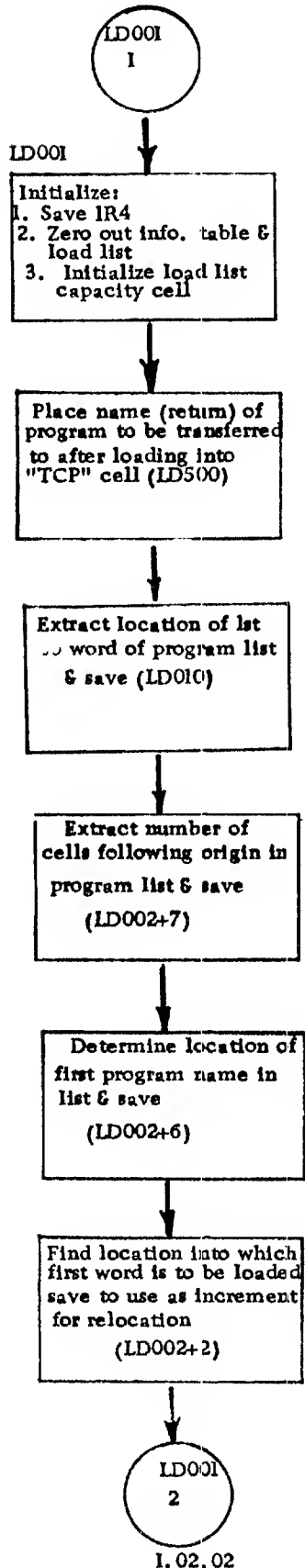




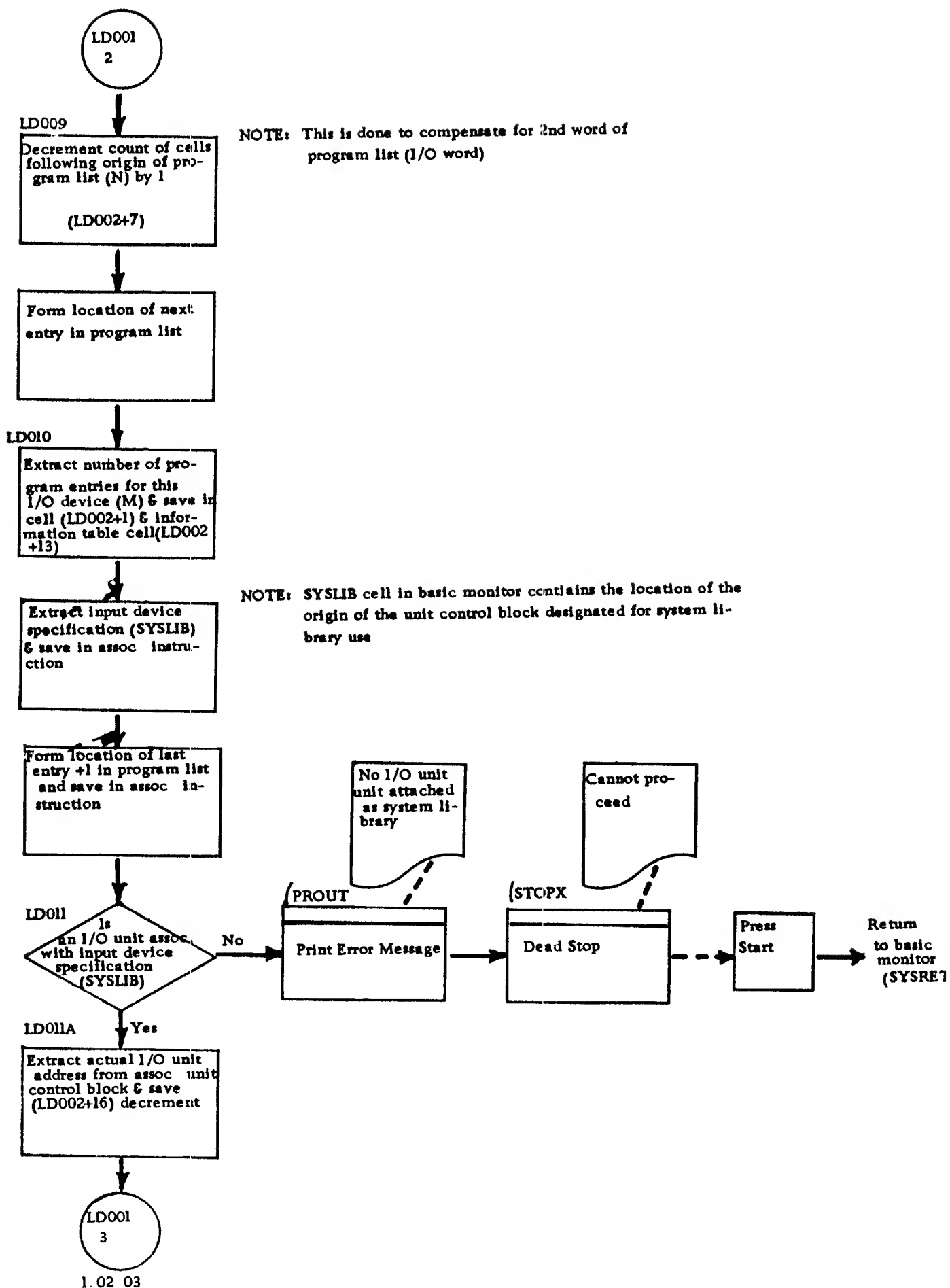
Sort sub program  
binary loader

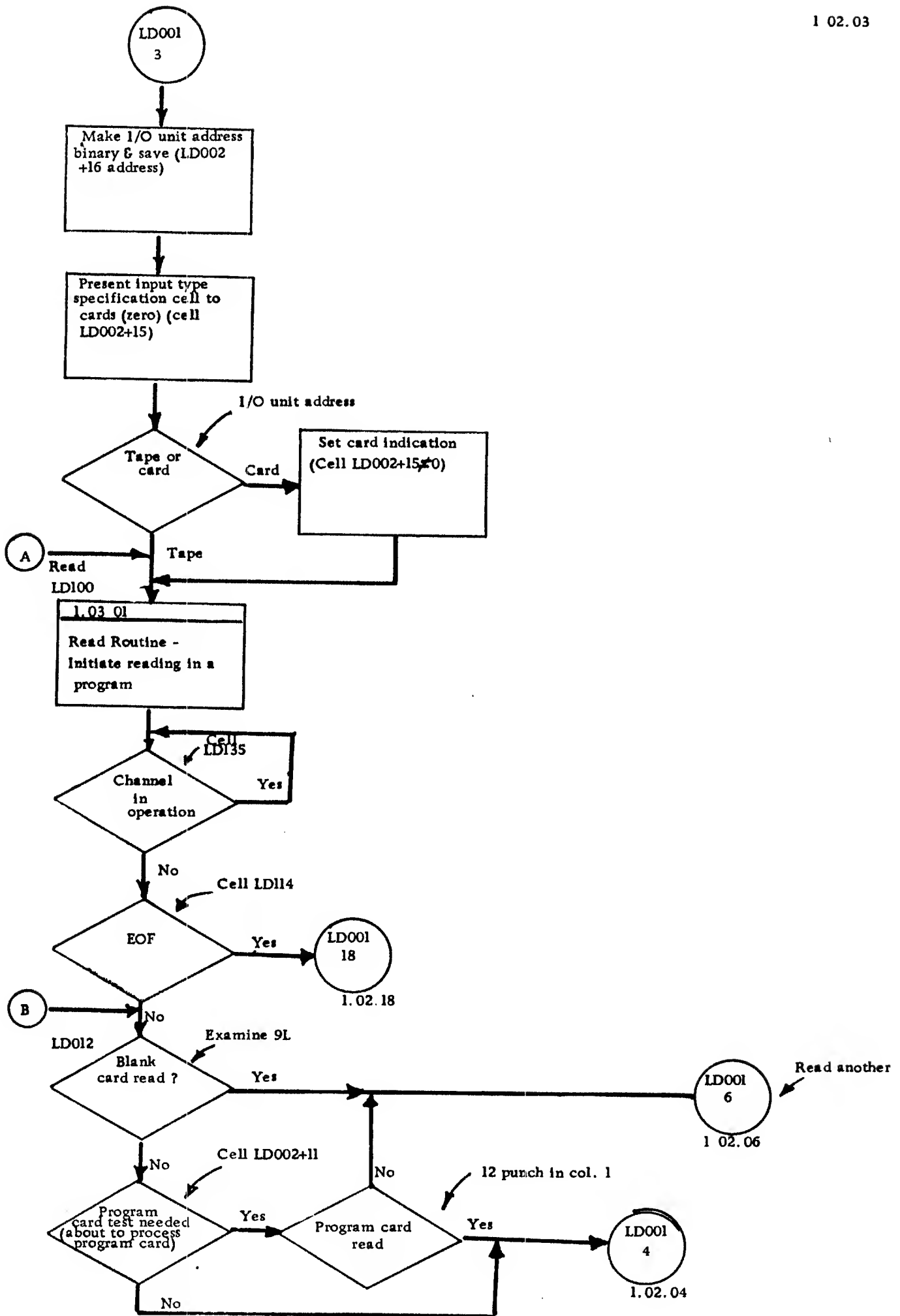
Calling Sequence:  
TSX LD001, 4  
PZE PGLIST,, N  
BCII, Return

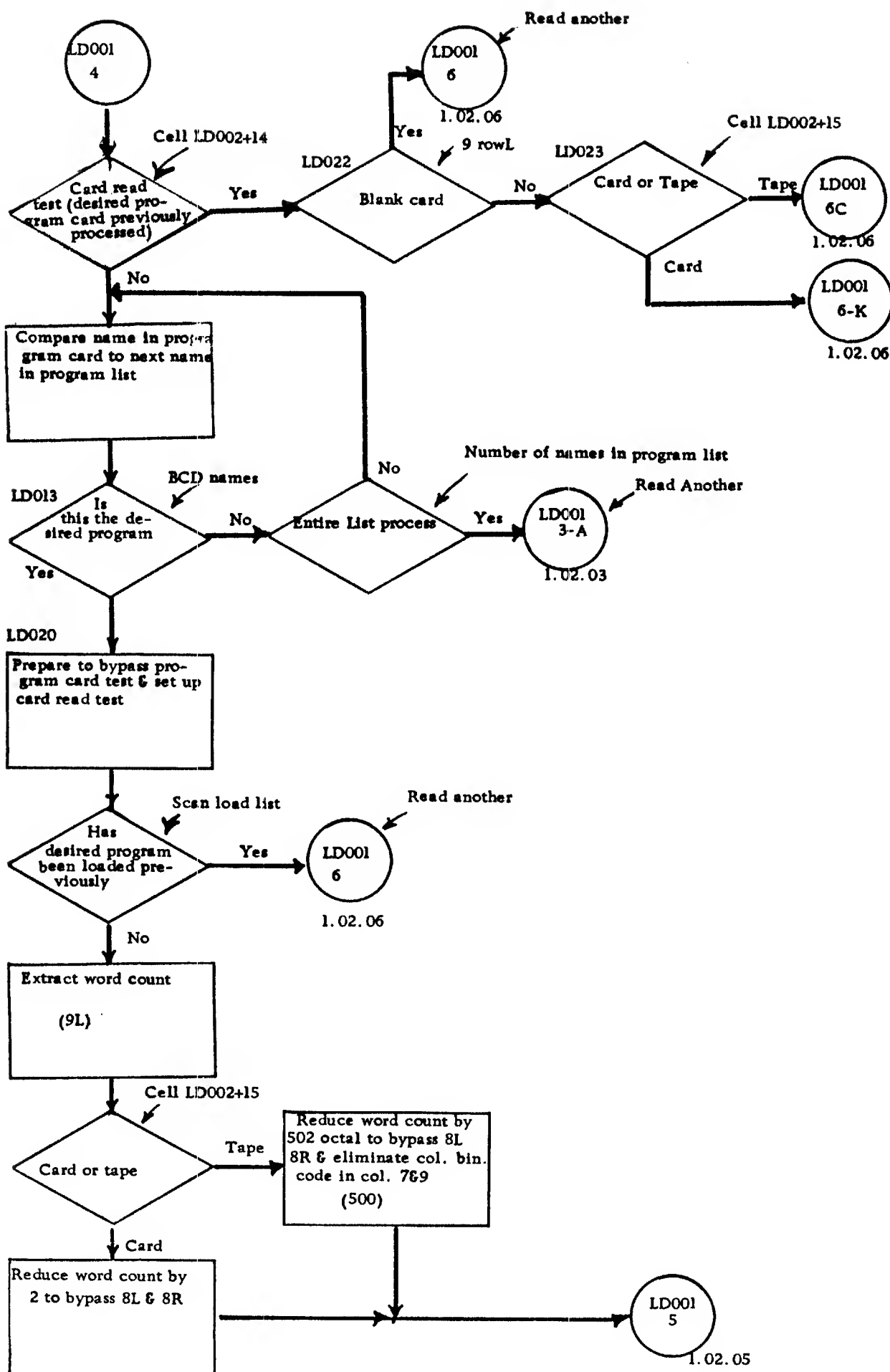
PGLIST = Address of beginning of list of programs to be loaded  
N = Number of cells following 1st cell in program list  
RETURN = Name of program to get control when loading is completed.

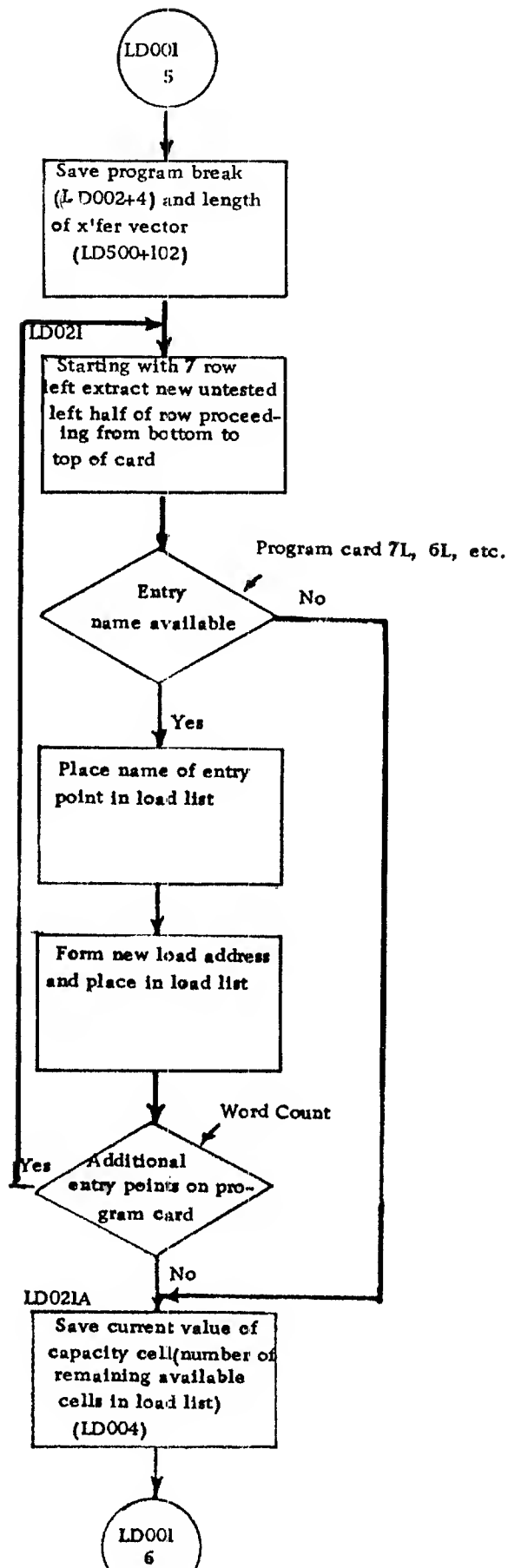


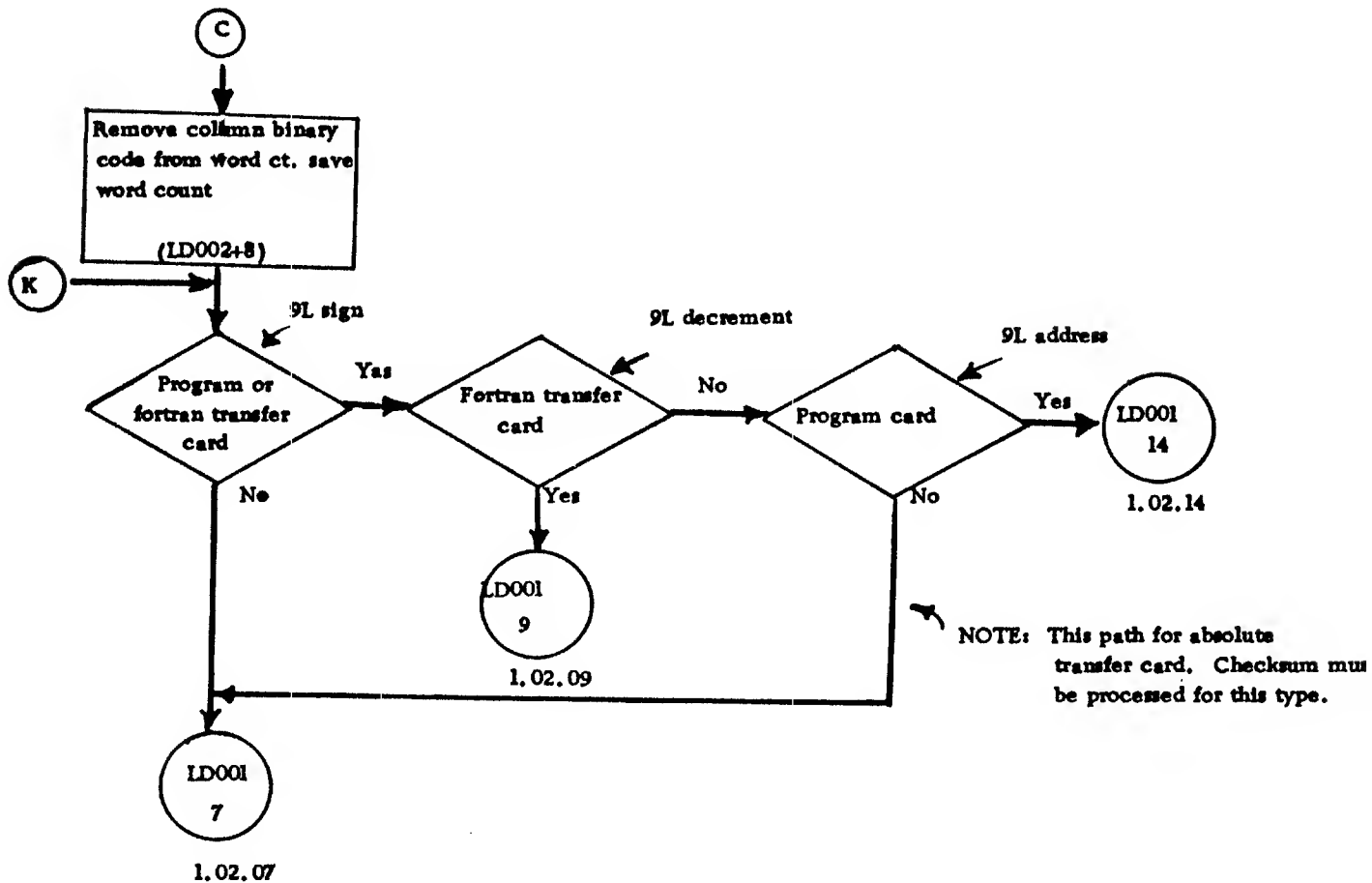
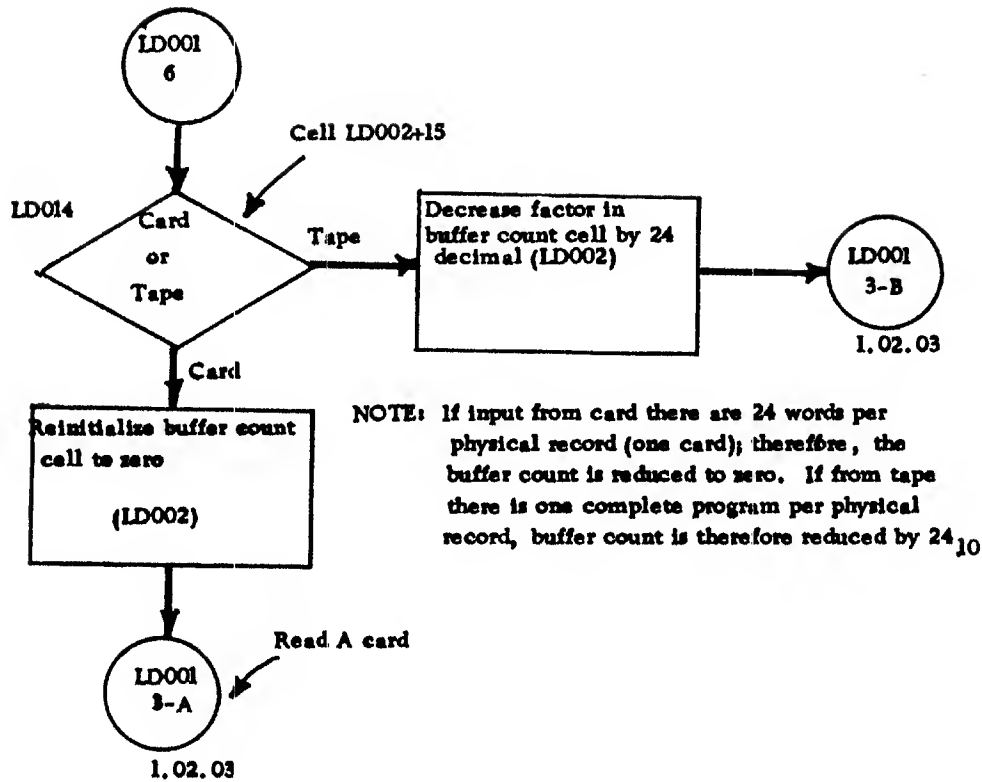
TCP = Transfer Control Point

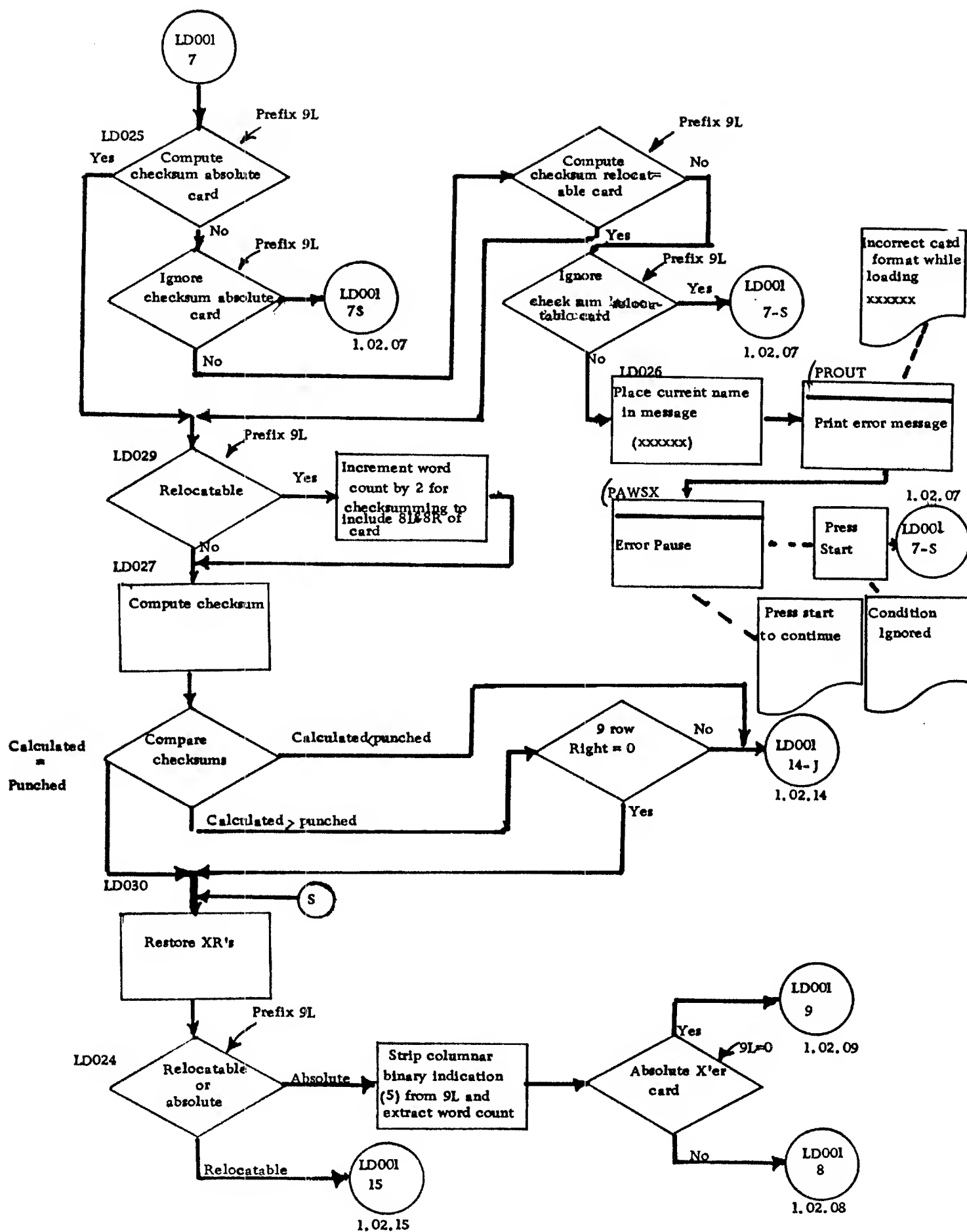


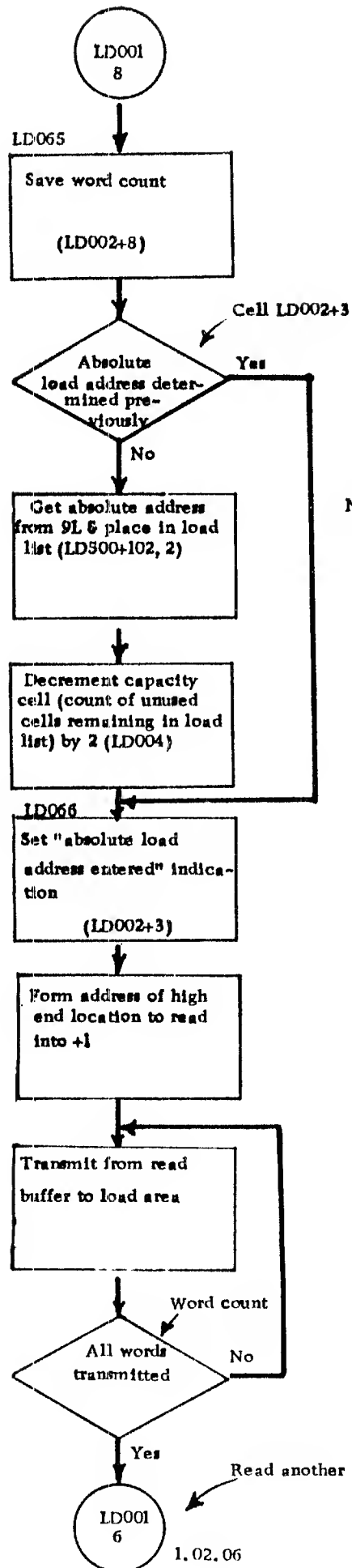






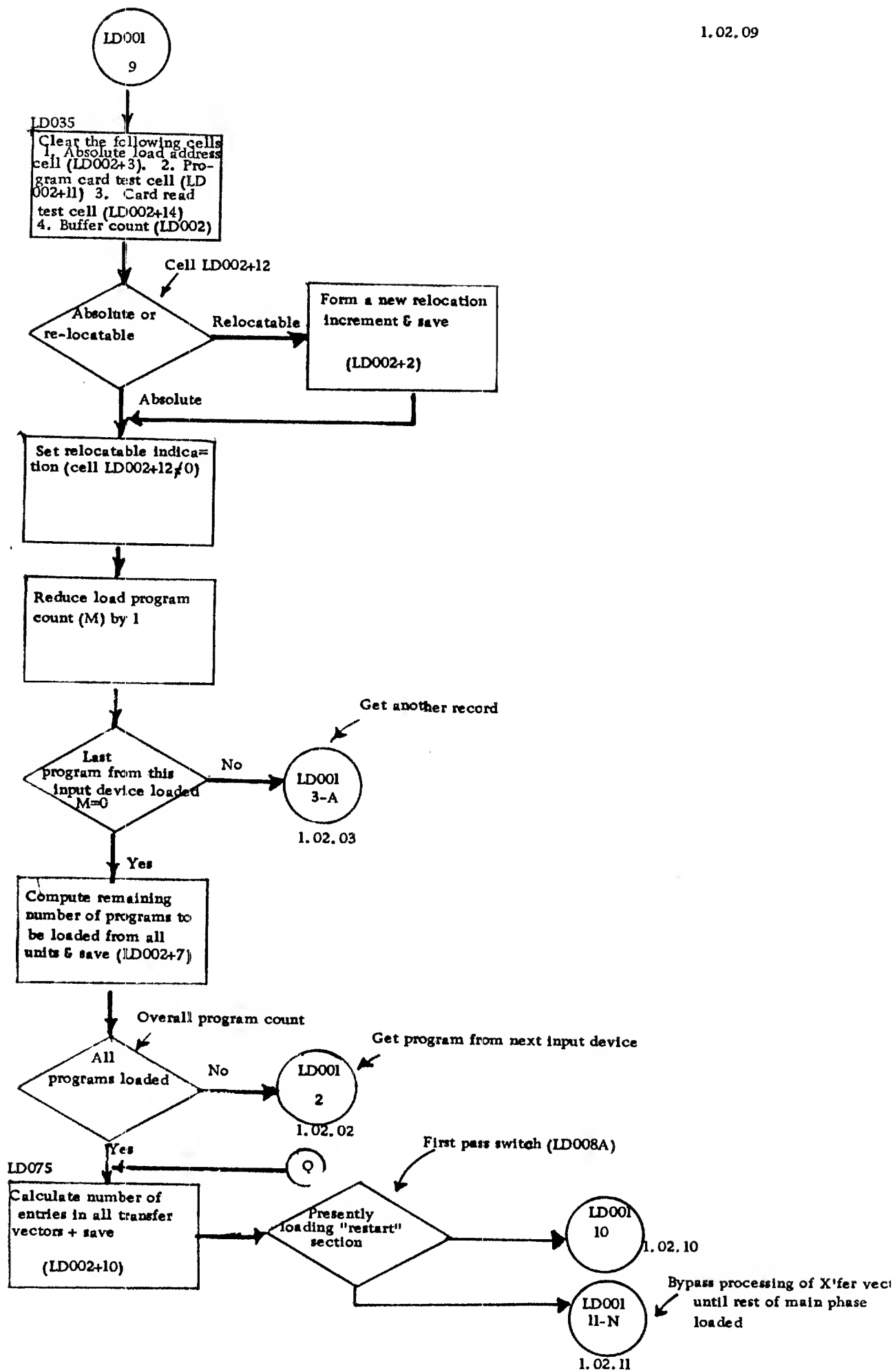


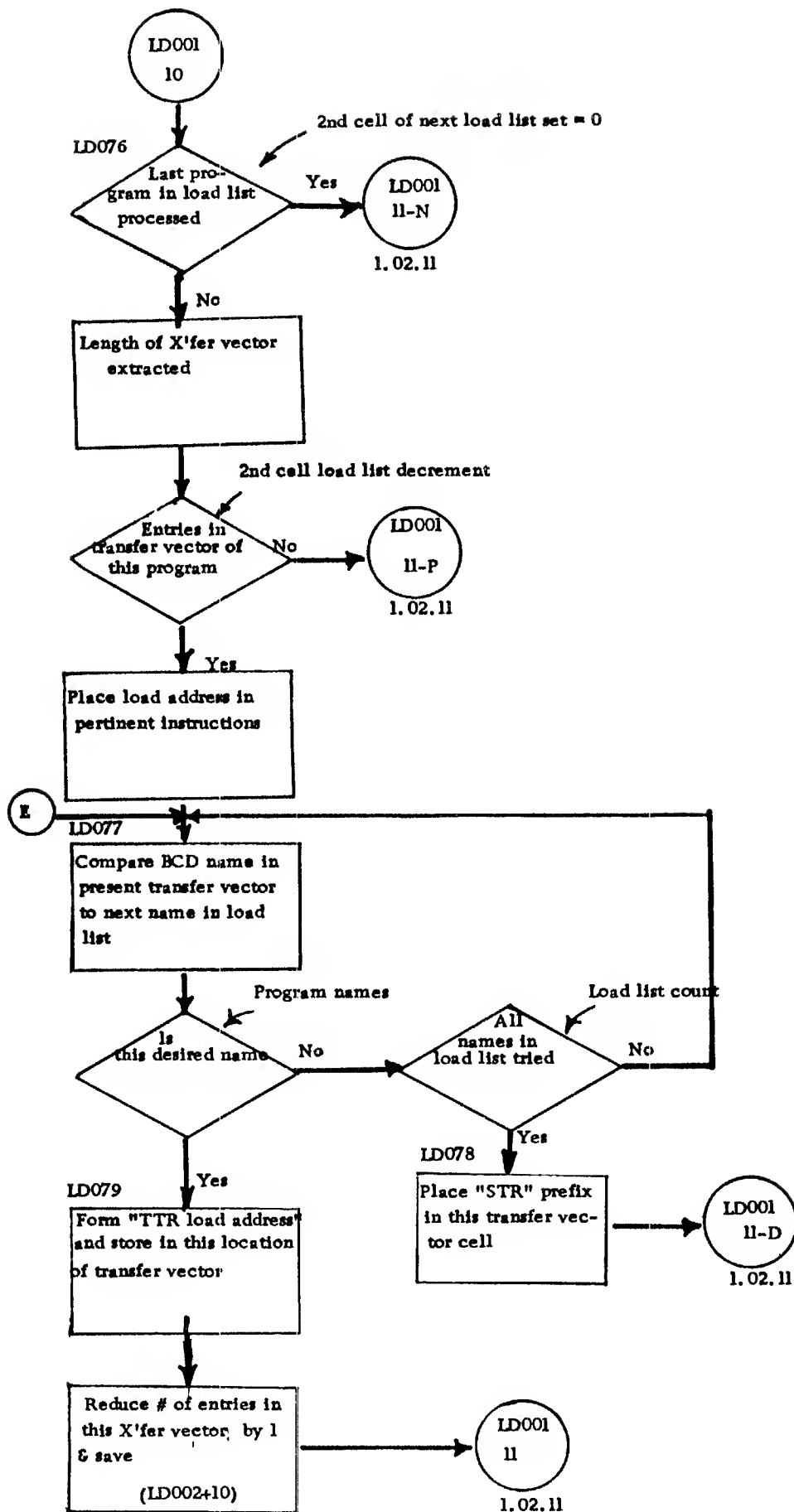


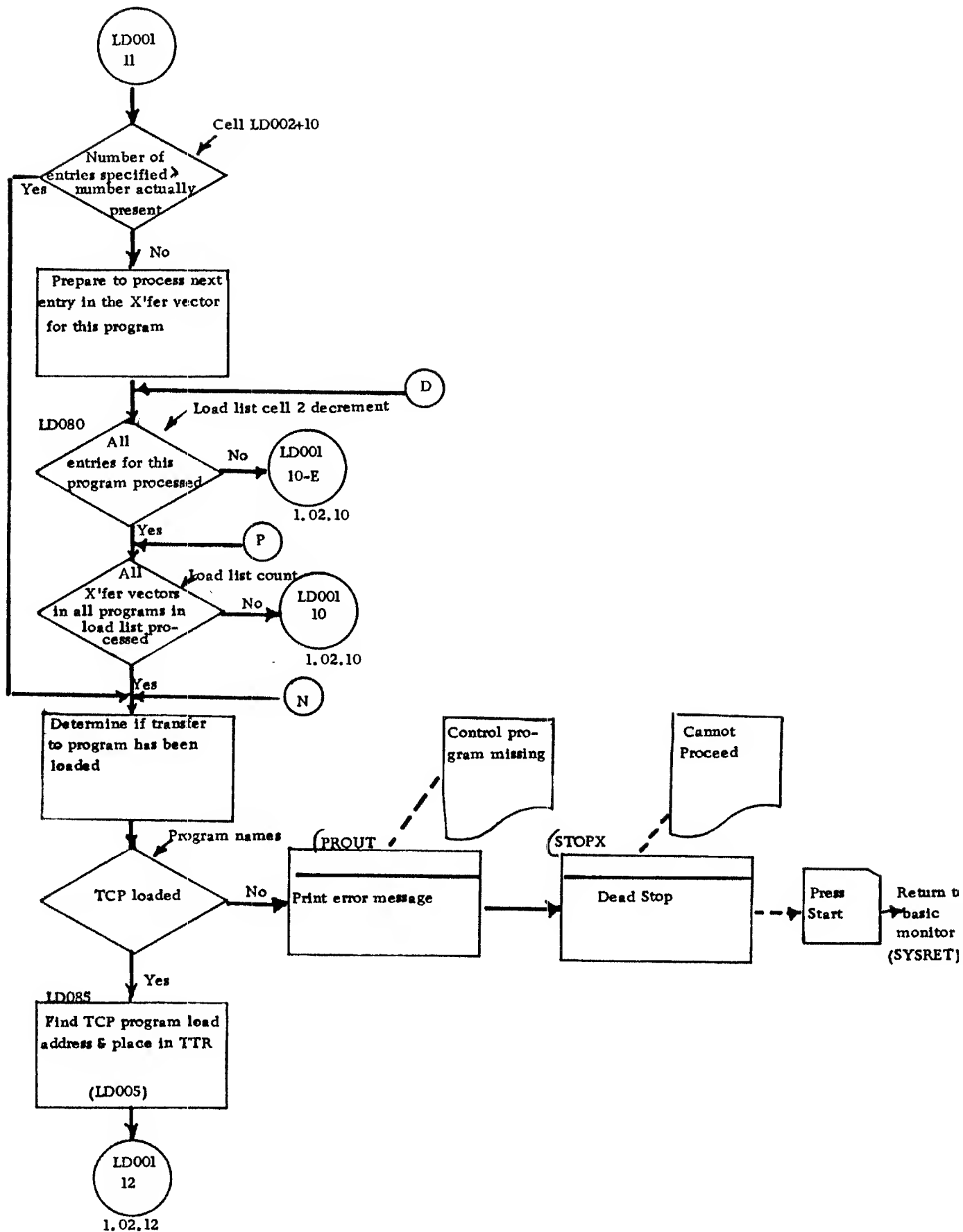


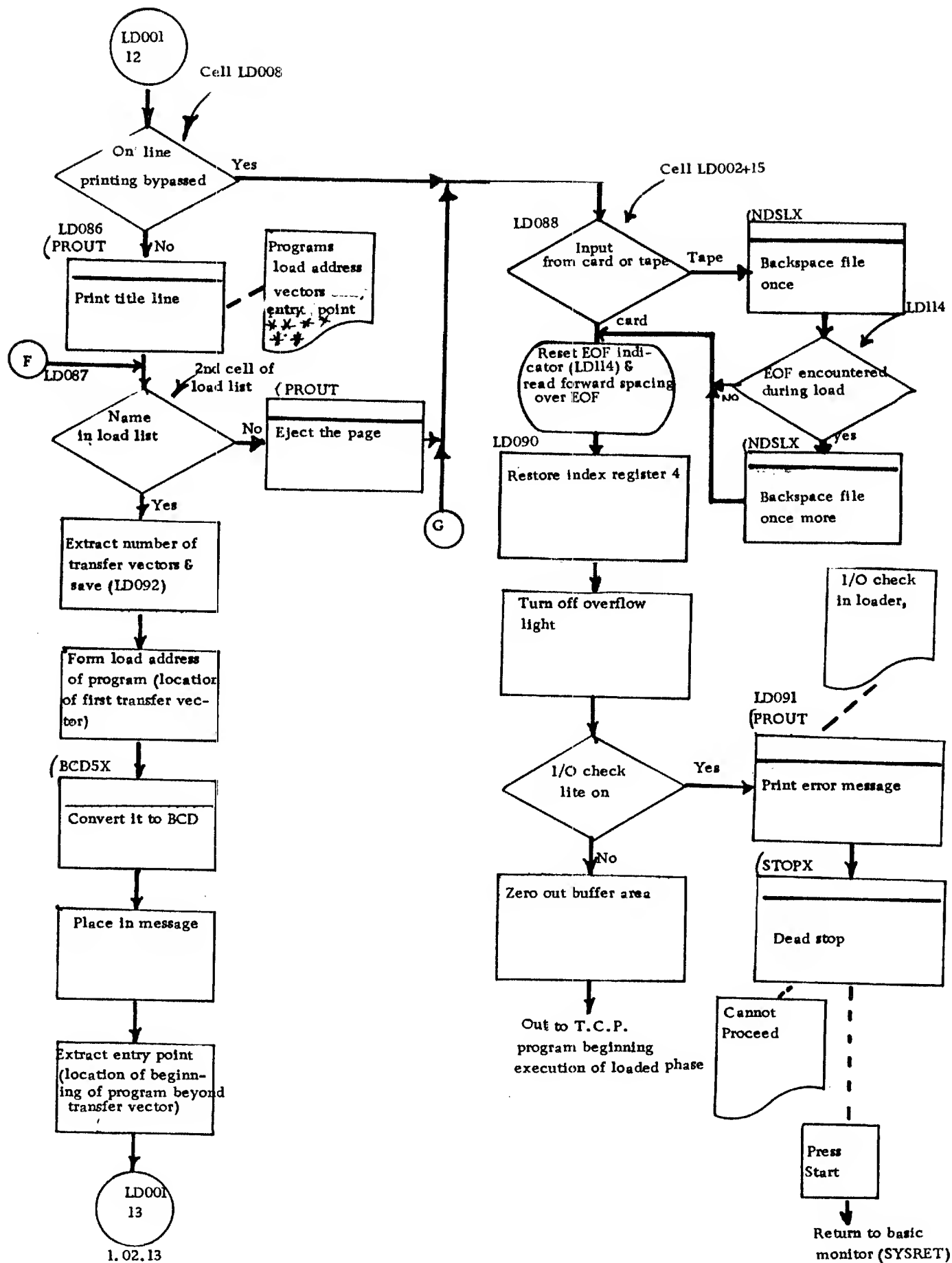
NOTE: IR2 - Load list pointer

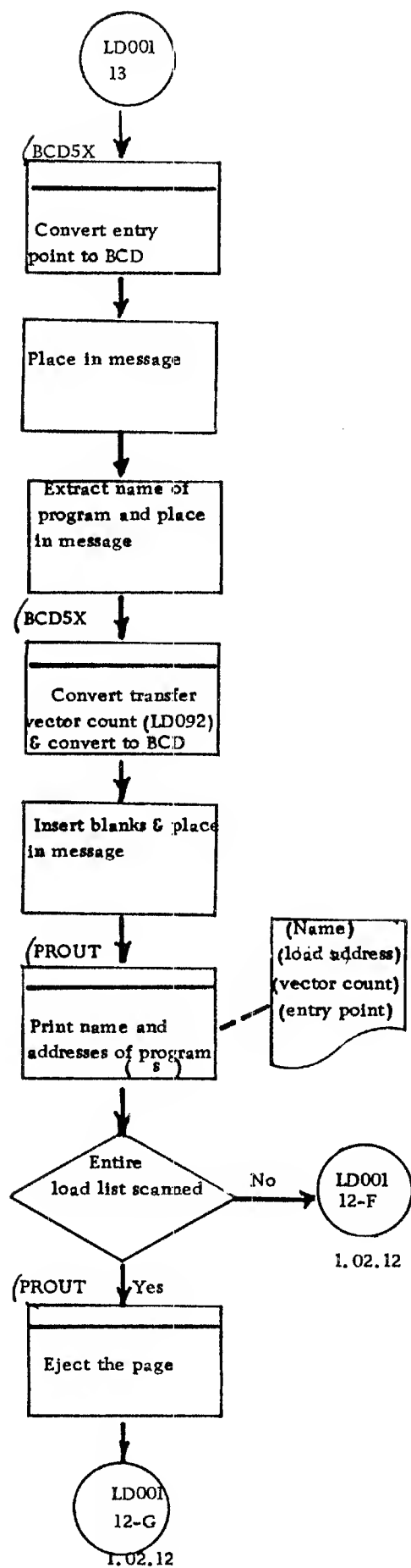


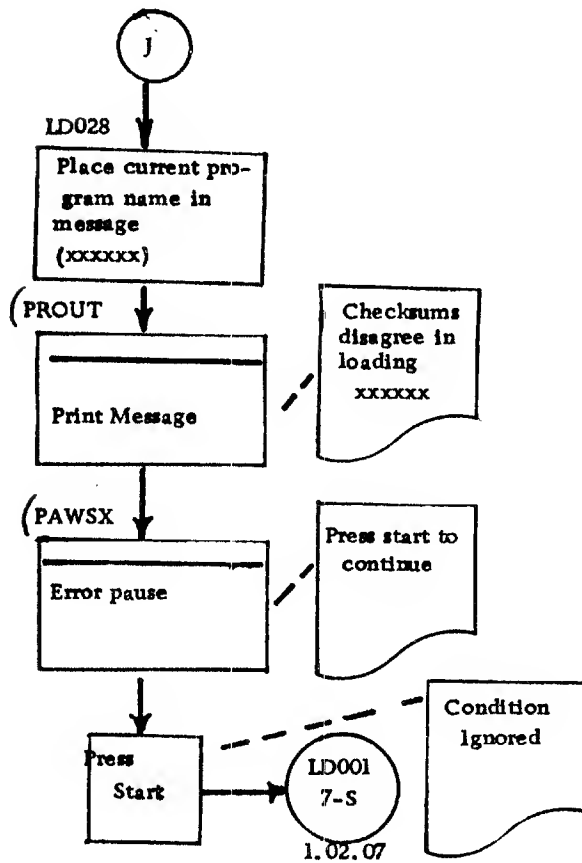
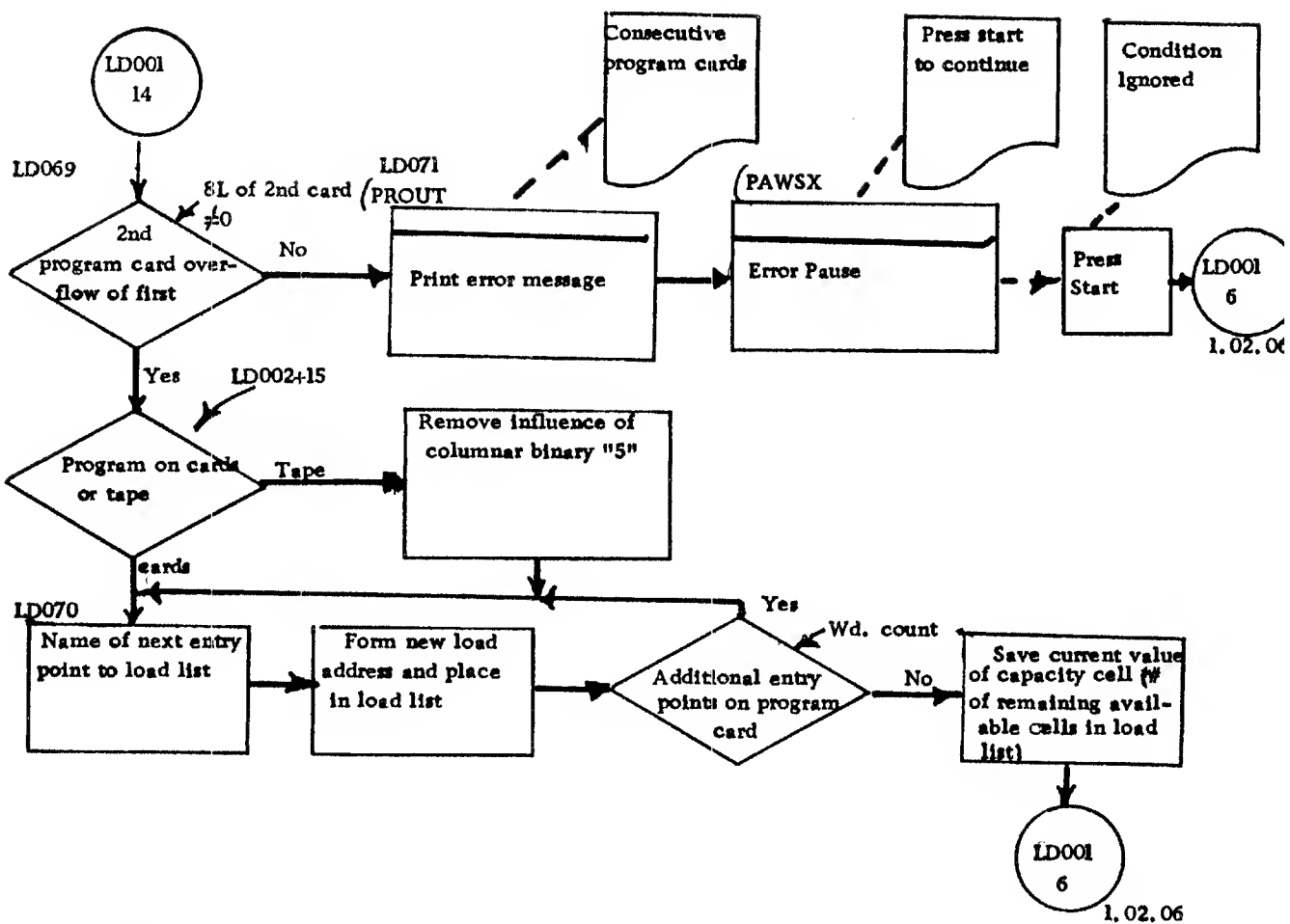


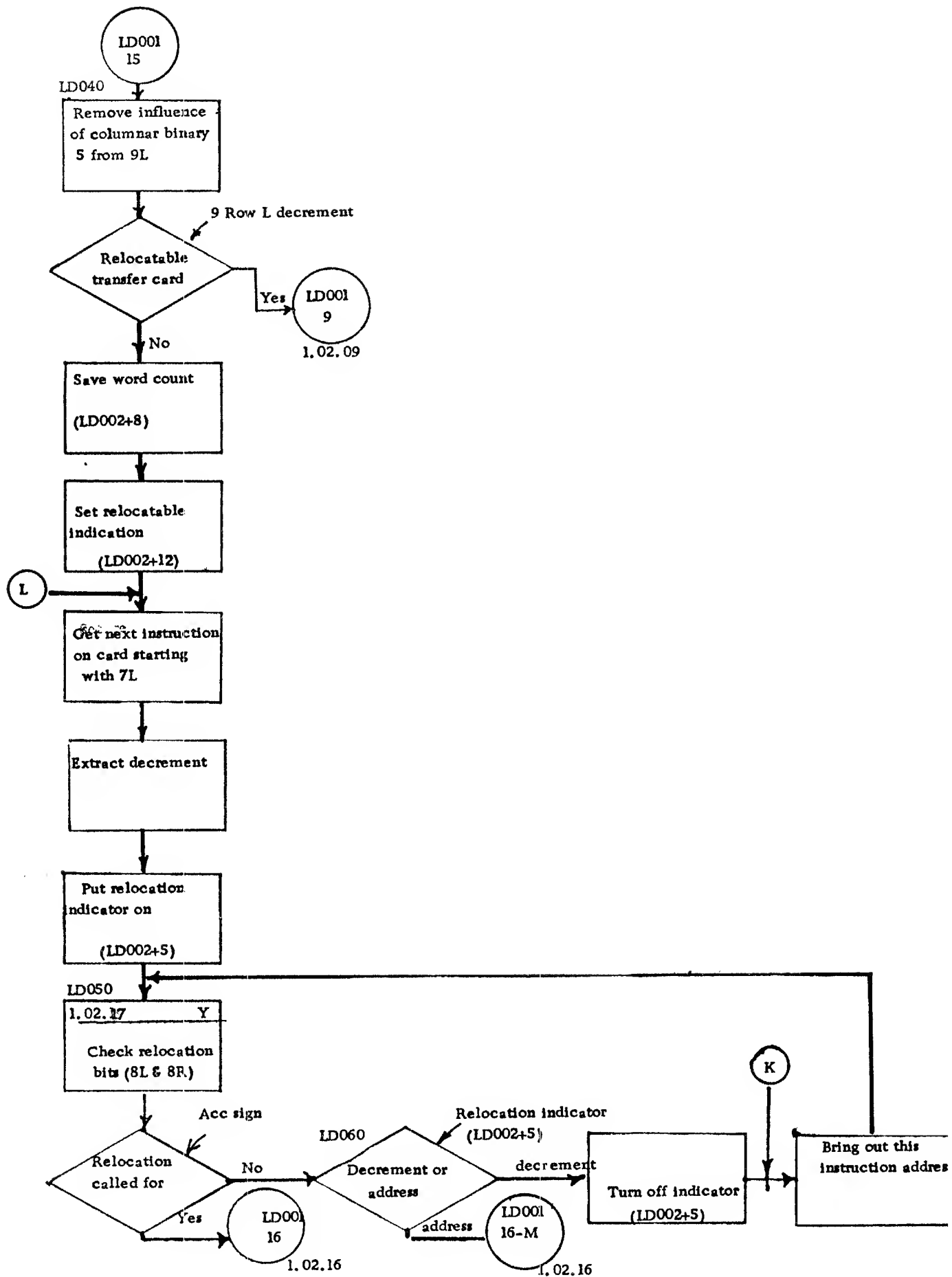


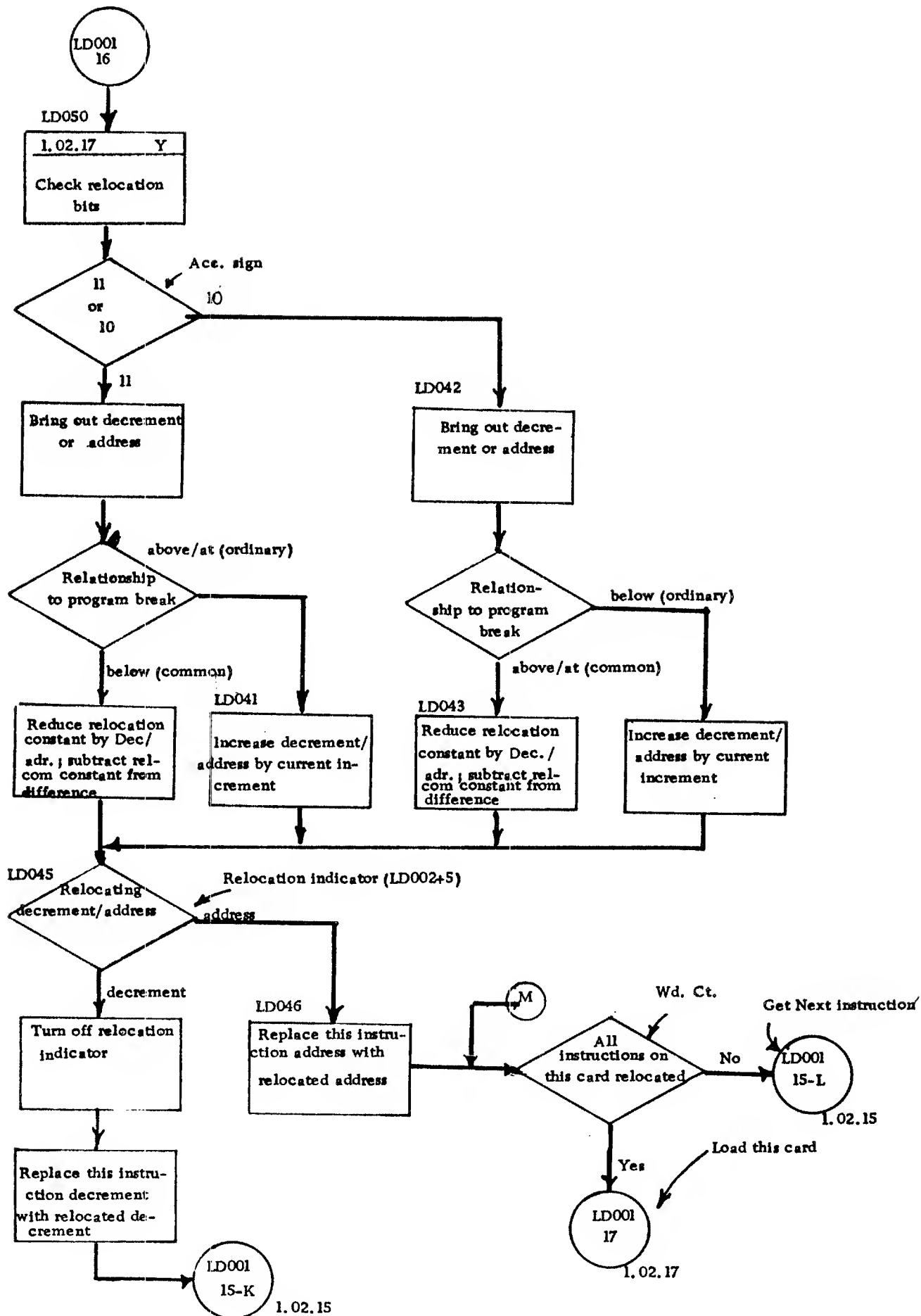




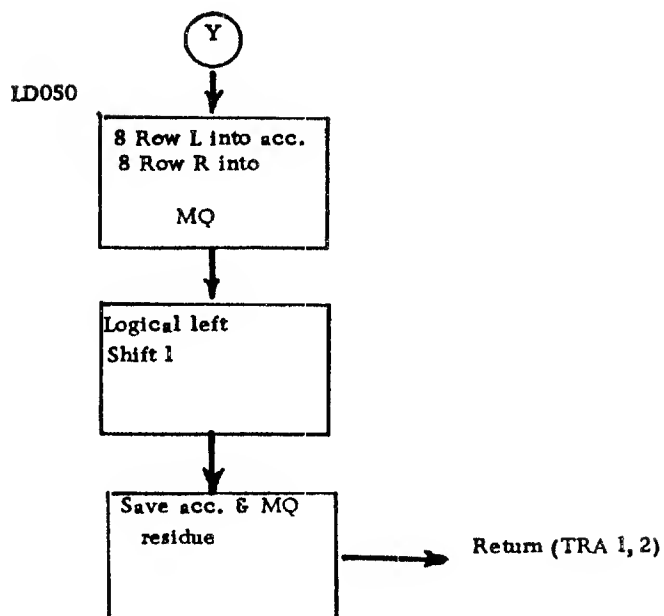
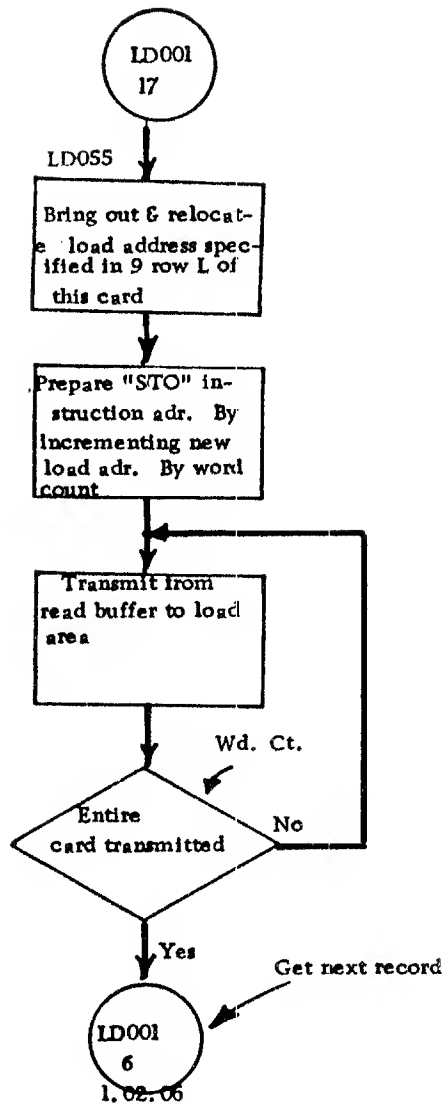


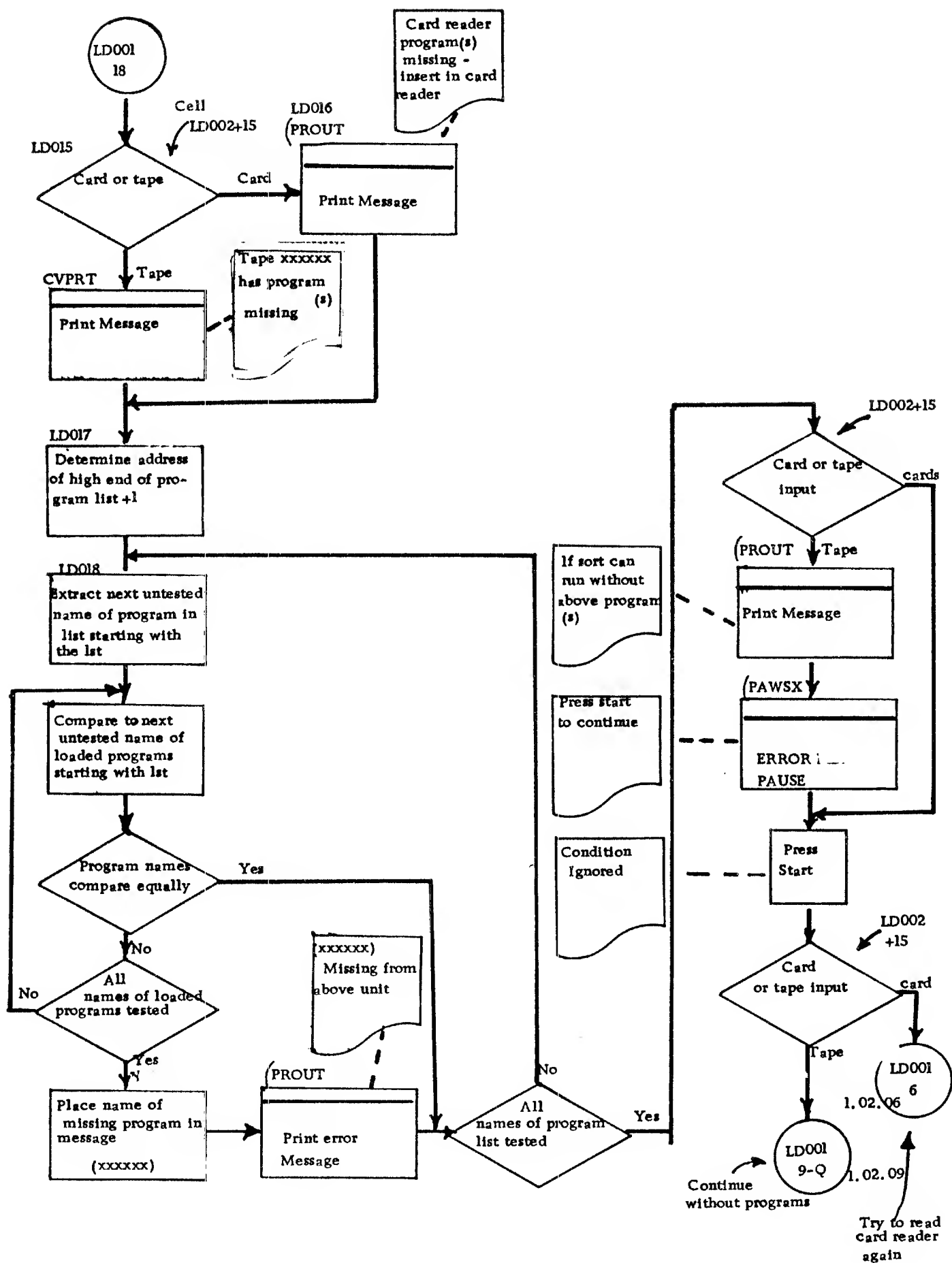


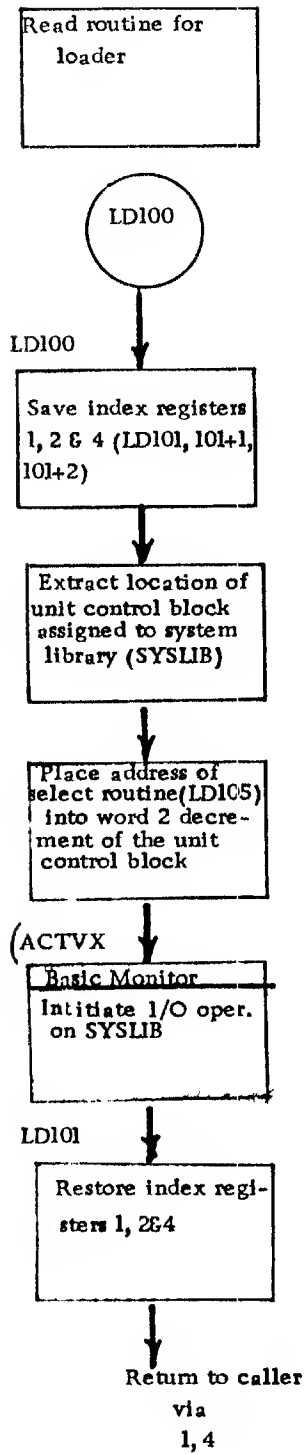




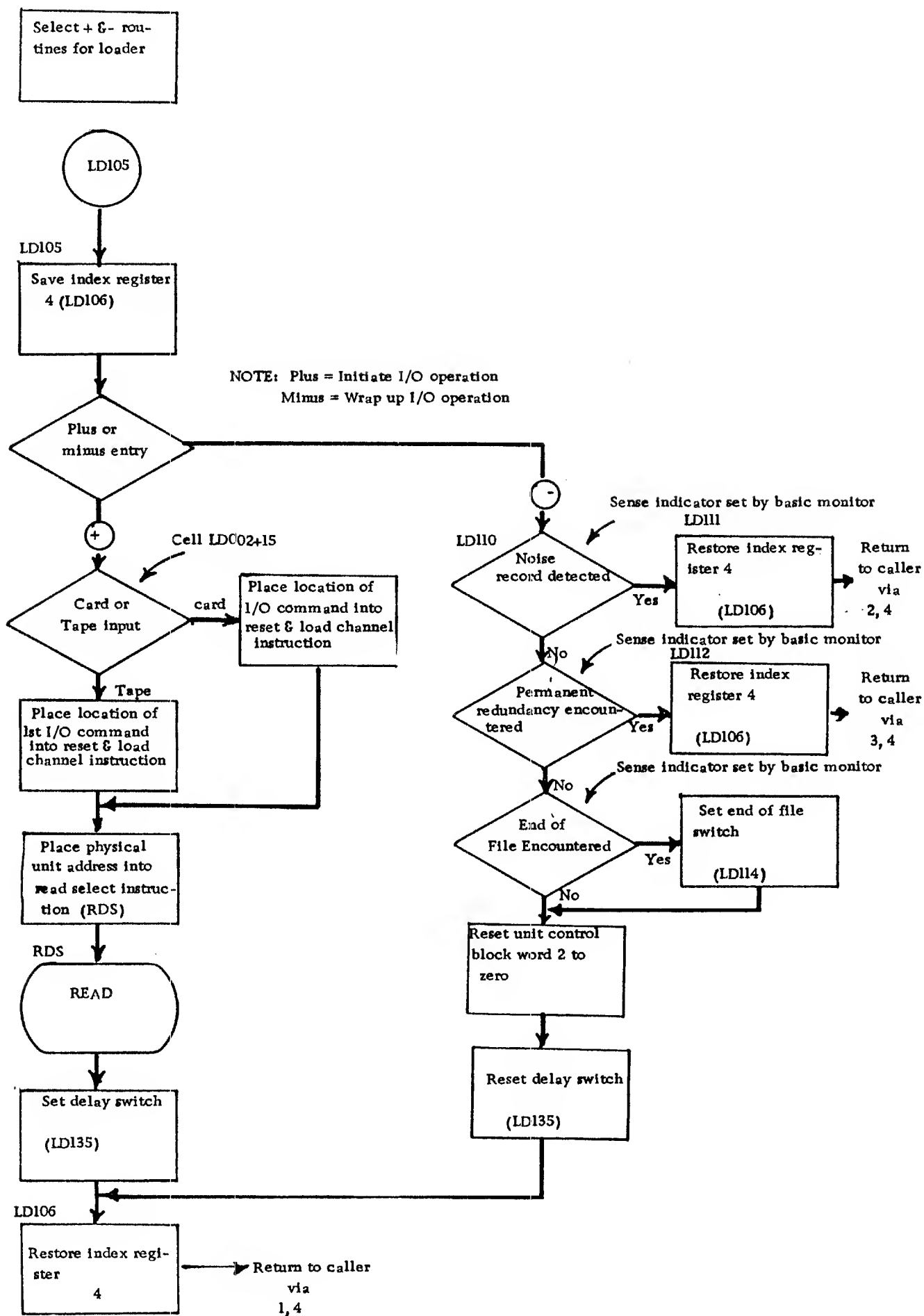








NOTE: Select routines on page 1.04.01



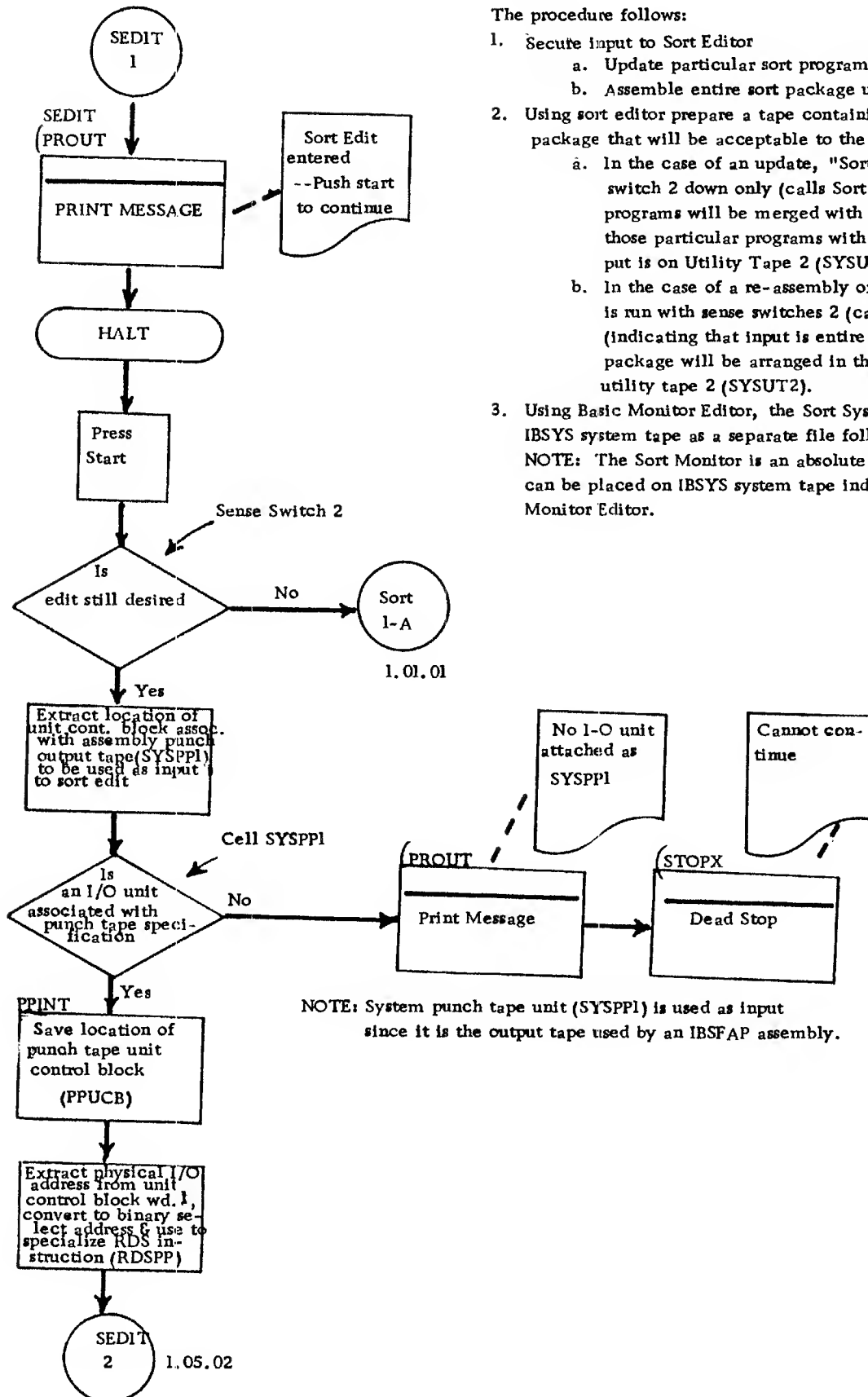
Sort Editor - To produce a tape in acceptable format as input to the IBSYS editor for insertion on IBSYS system tape

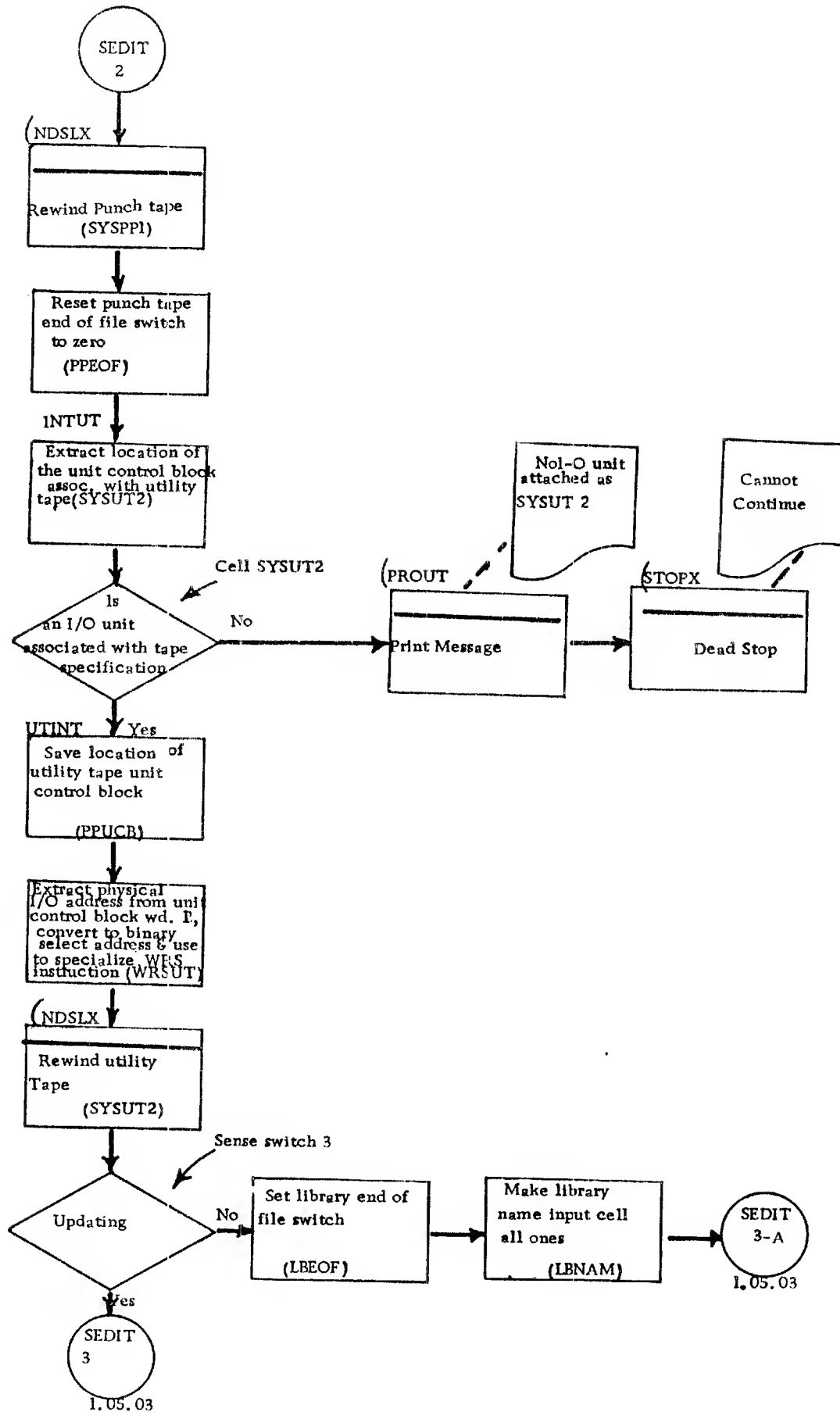
Due to the fact that the Basic Monitor (BSYS) editor will not accept relocatable input to form a system tape, some means of preparing the sort package for input to the IBSYS editor must be provided. This is the function of the Sort Editor.

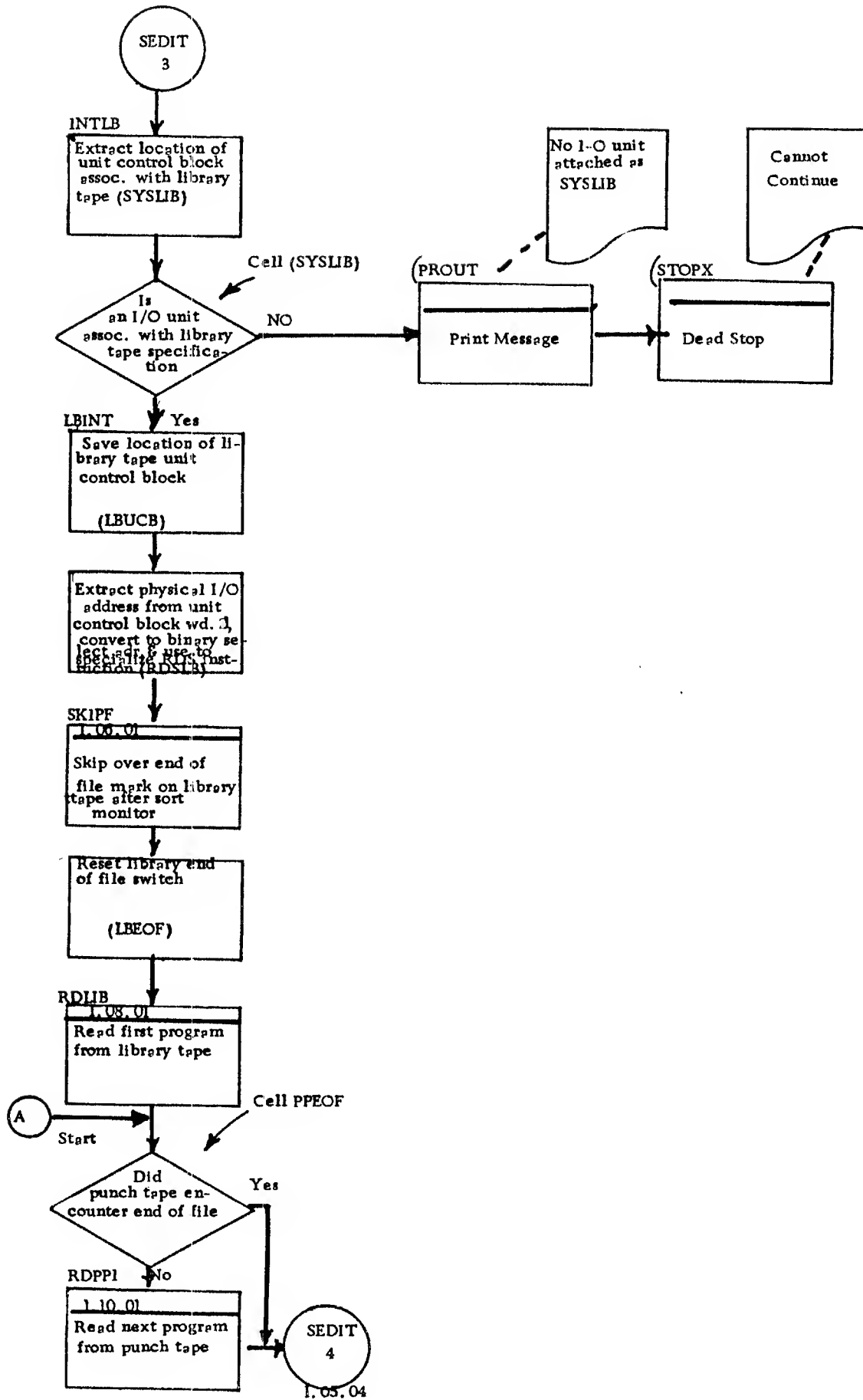
The procedure follows:

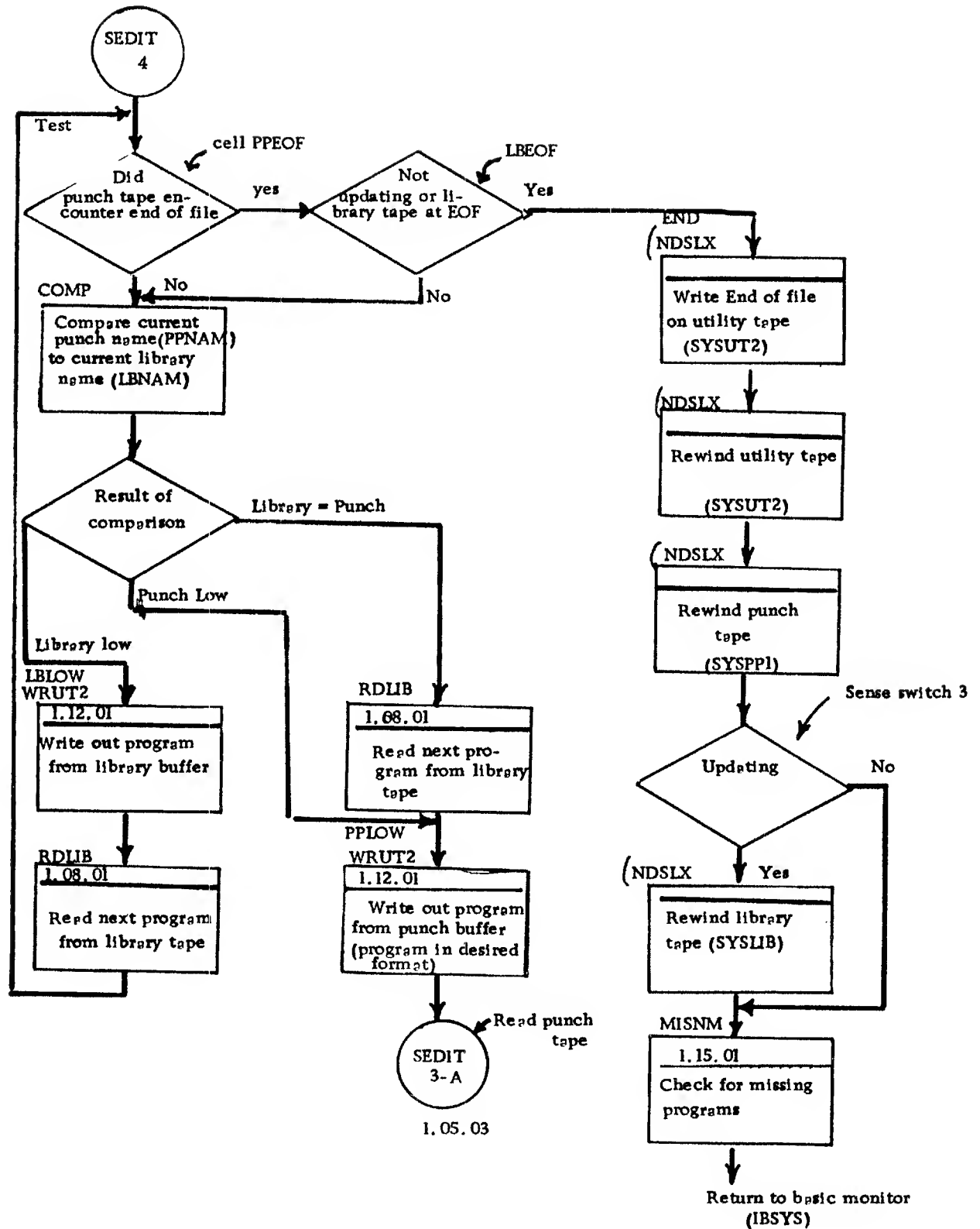
1. Secure input to Sort Editor
  - a. Update particular sort programs that are to be changed.
  - b. Assemble entire sort package using IBSFAP
2. Using sort editor prepare a tape containing the entire sort package that will be acceptable to the Basic Monitor Editor.
  - a. In the case of an update, "Sort" is run with sense switch 2 down only (calls Sort Editor). The updated programs will be merged with existing system replacing those particular programs with updated version. Output is on Utility Tape 2 (SYSUT2)
  - b. In the case of a re-assembly of the entire package, Sort is run with sense switches 2 (calls Sort Editor) and 3 (indicating that input is entire sort package) down. The package will be arranged in the desired format on output utility tape 2 (SYSUT2).
3. Using Basic Monitor Editor, the Sort System is inserted on the IBSYS system tape as a separate file following the Sort Monitor.
 

NOTE: The Sort Monitor is an absolute assembly and therefore can be placed on IBSYS system tape individually by Basic Monitor Editor.

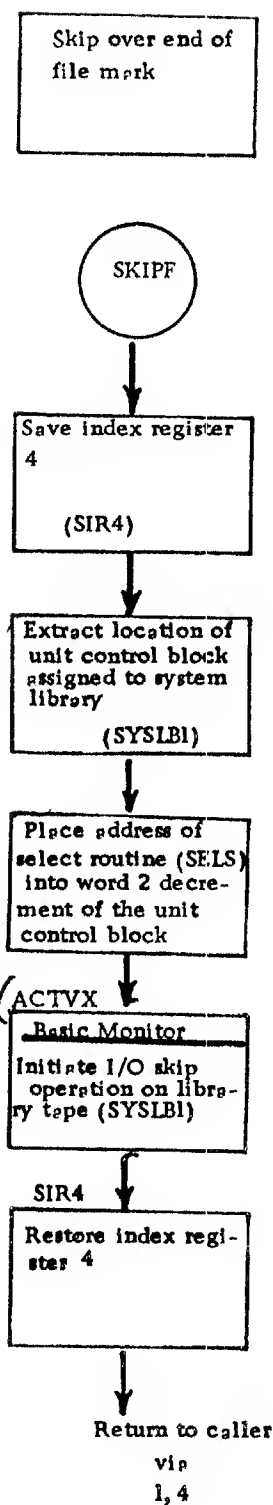






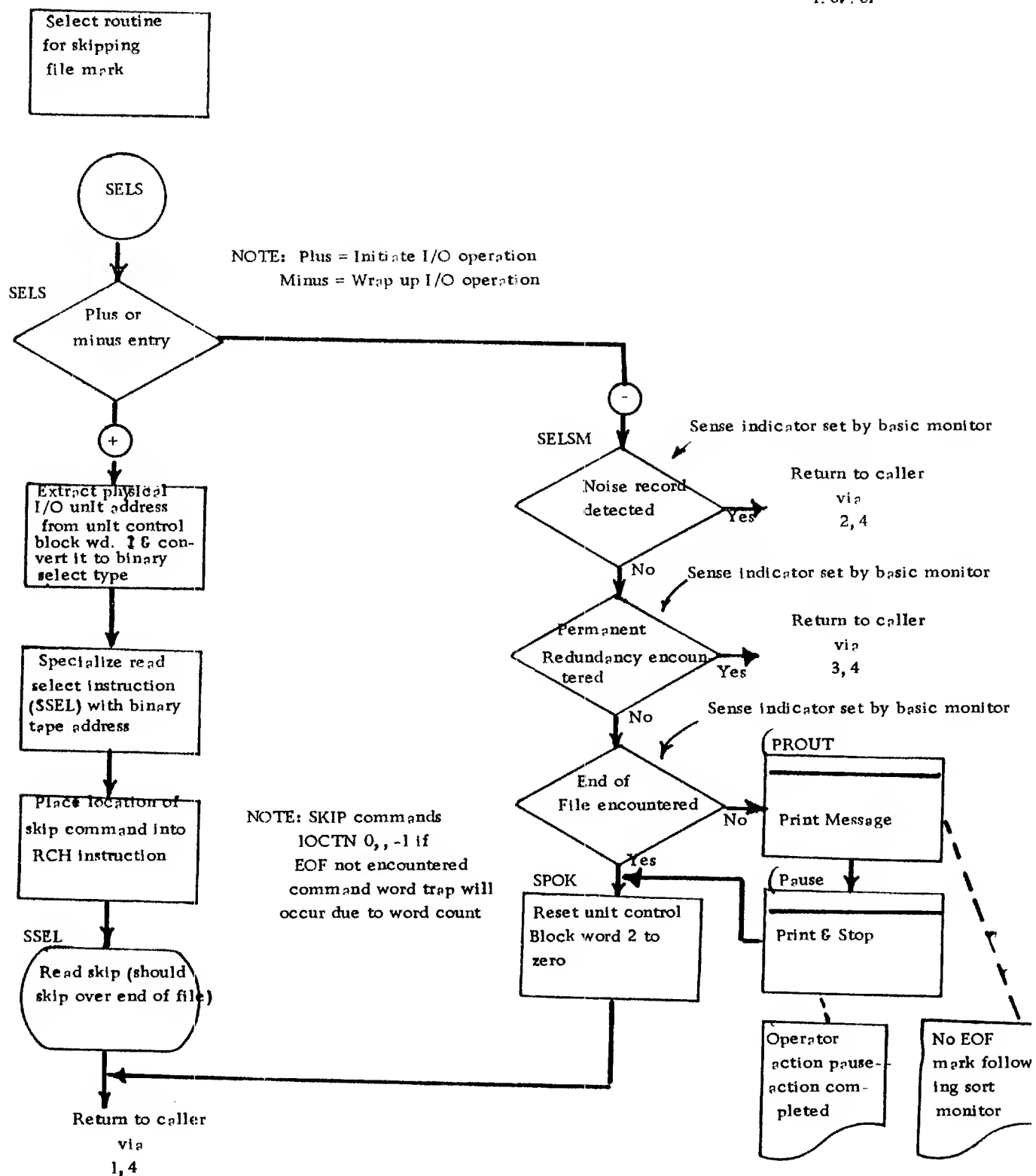


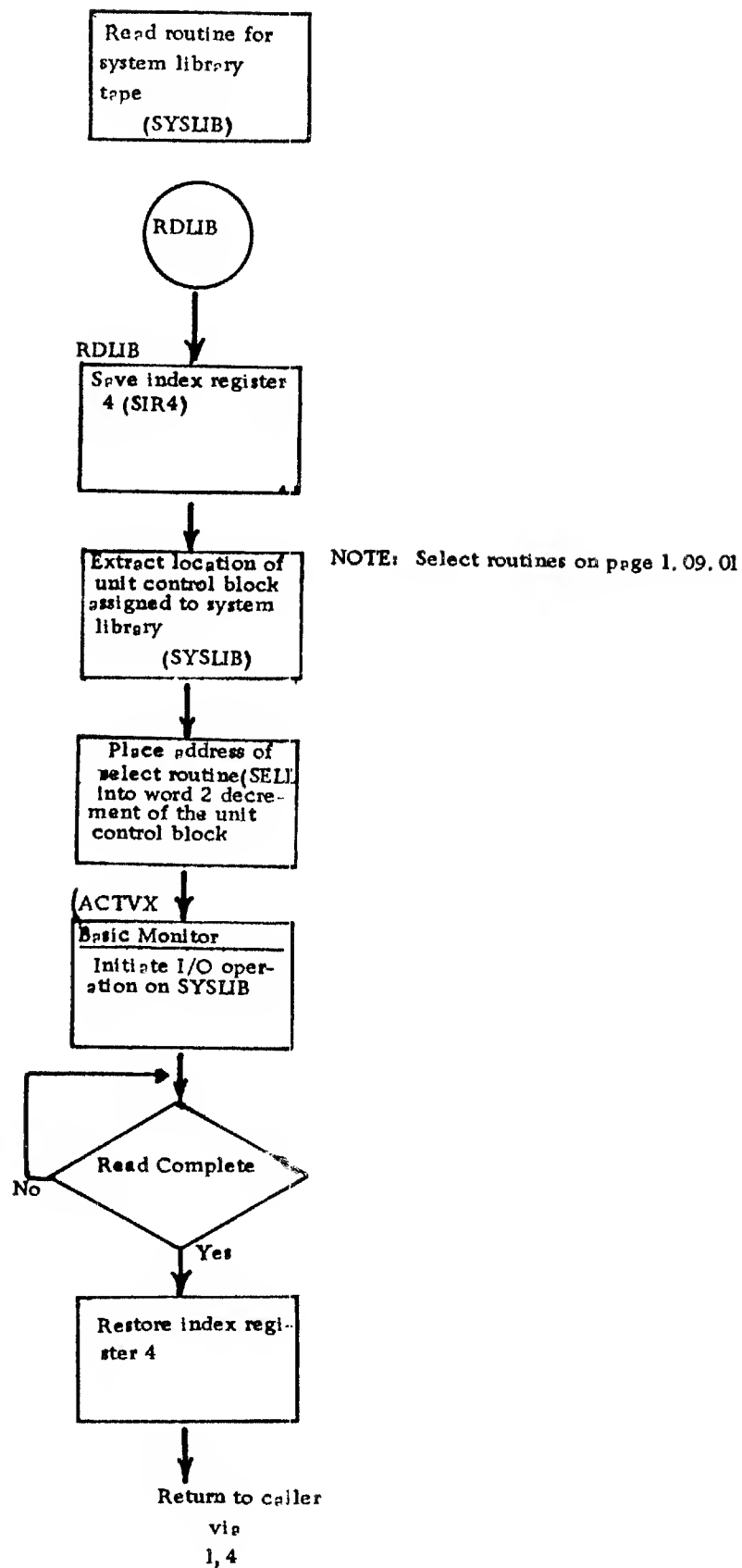




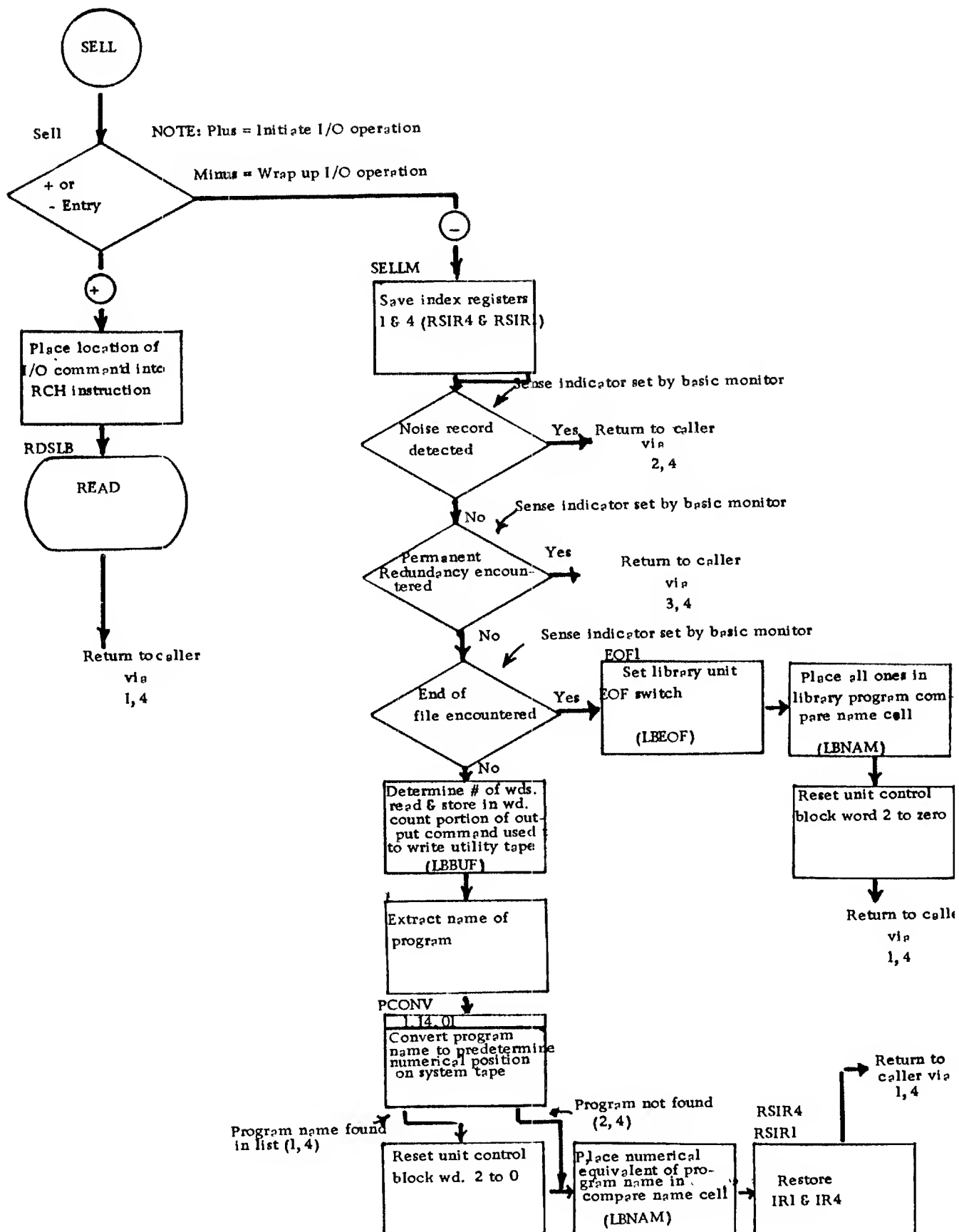
NOTE: SYSLIB is made synonymous to either SYSLIB1 or another designation in sort monitor. The sort monitor is always on SYSLIB1; therefore, if it is specified as SYSLIB the end of file mark after sort monitor must be skipped. If SYSLIB is given a "designation" other than SYSLIB1 this routine will have no effect.

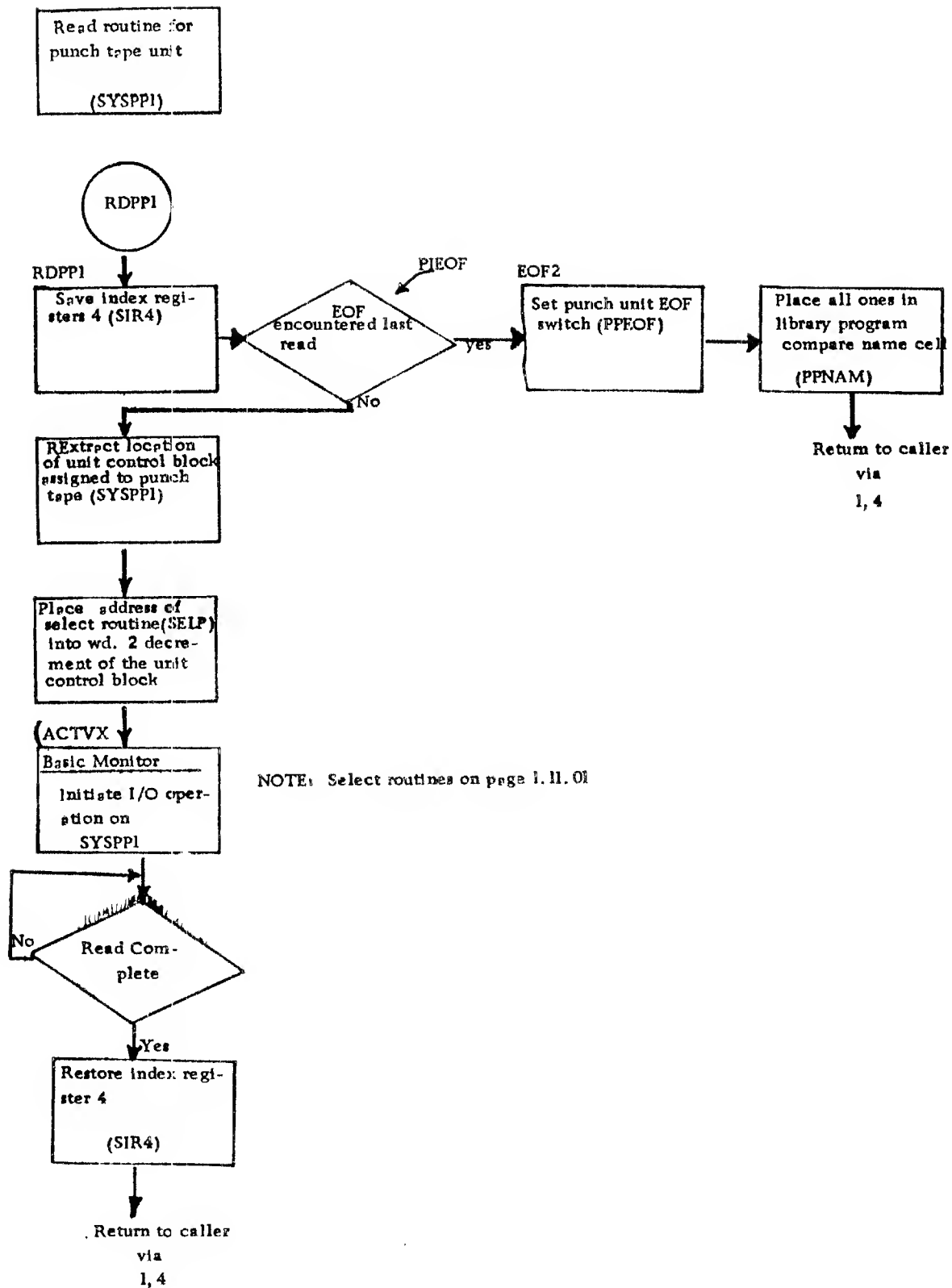
NOTE: Select routines on page 1.07.01



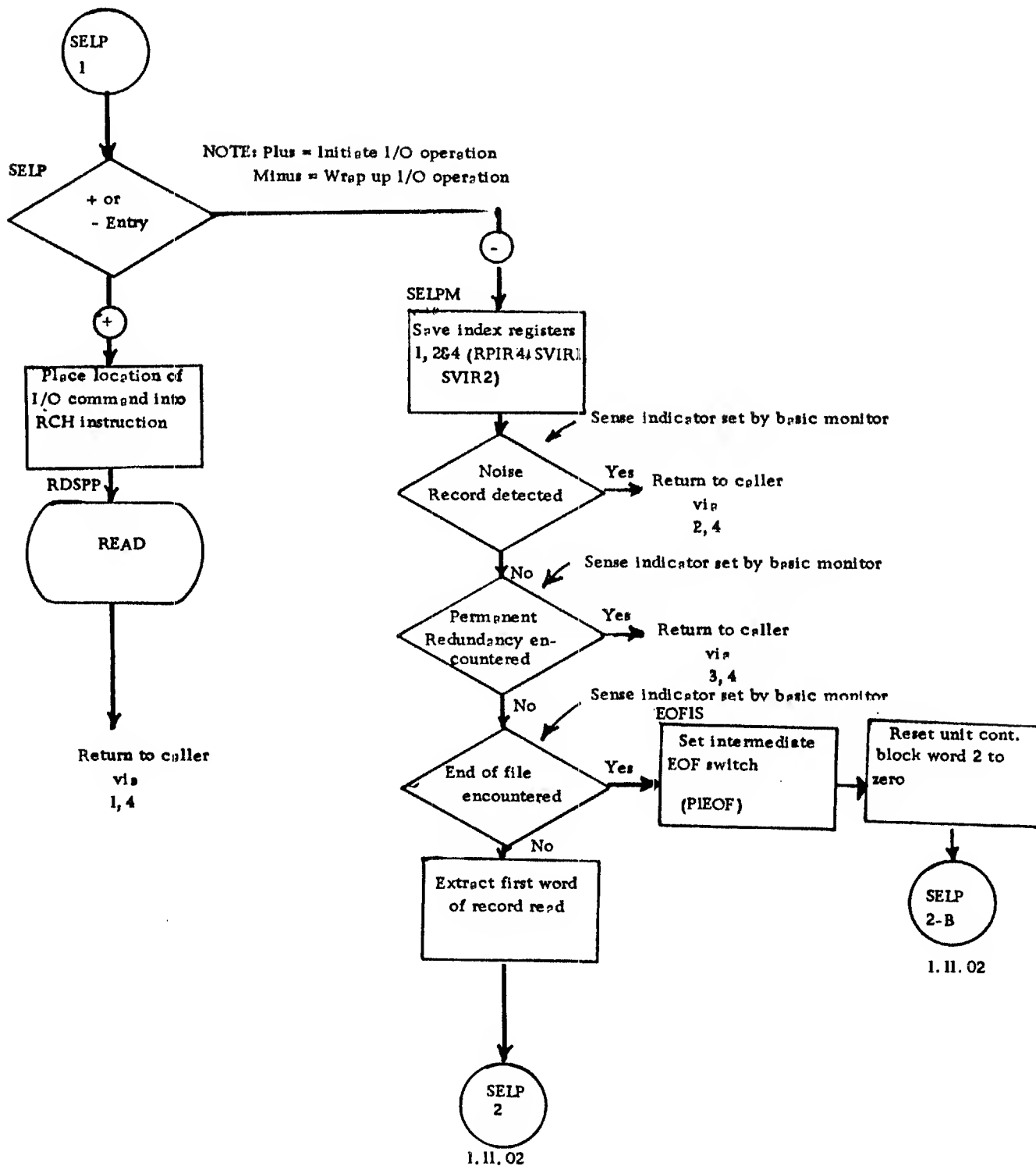


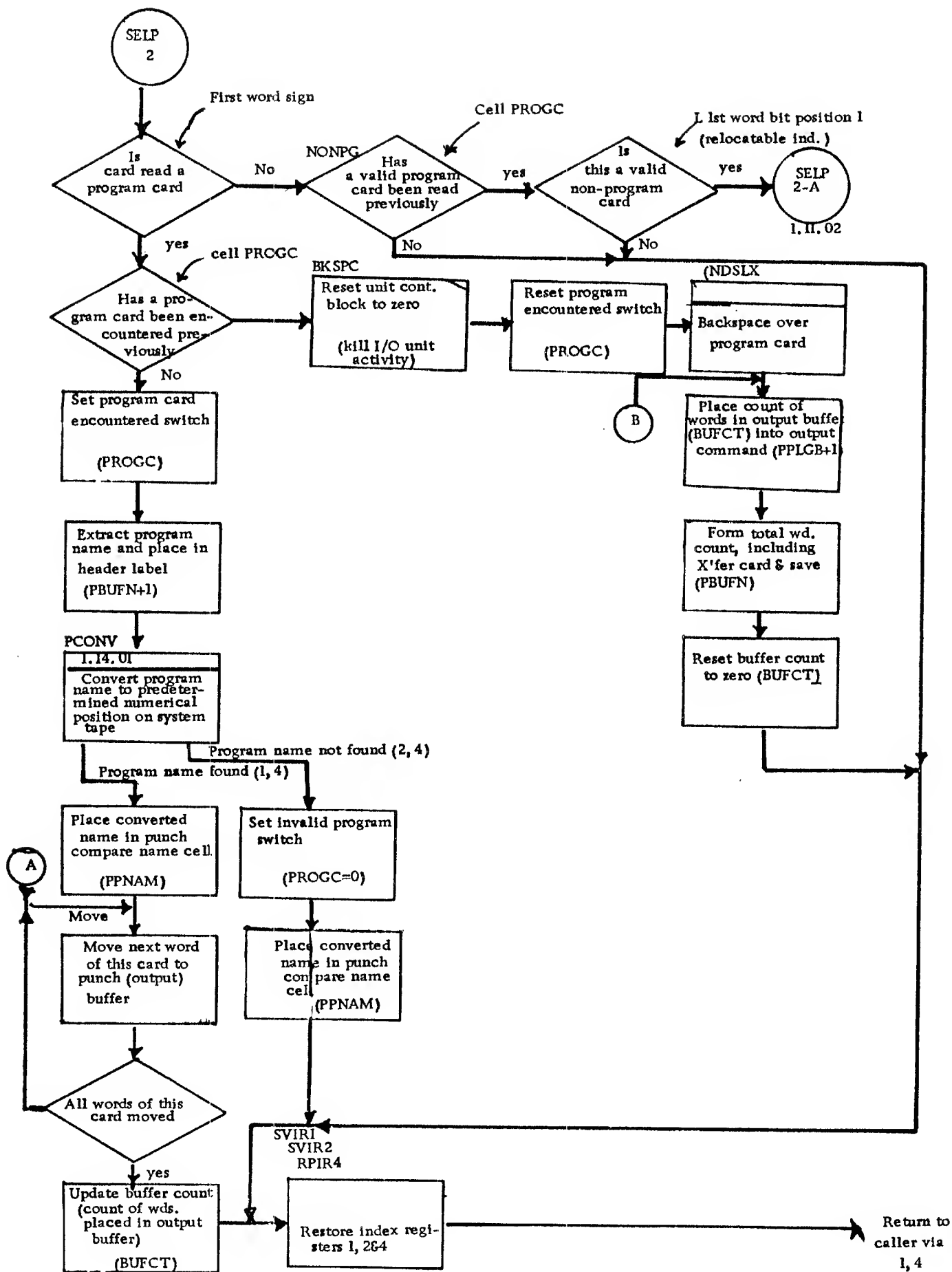
Select + & - routines  
for library tape  
(SYSLIB)

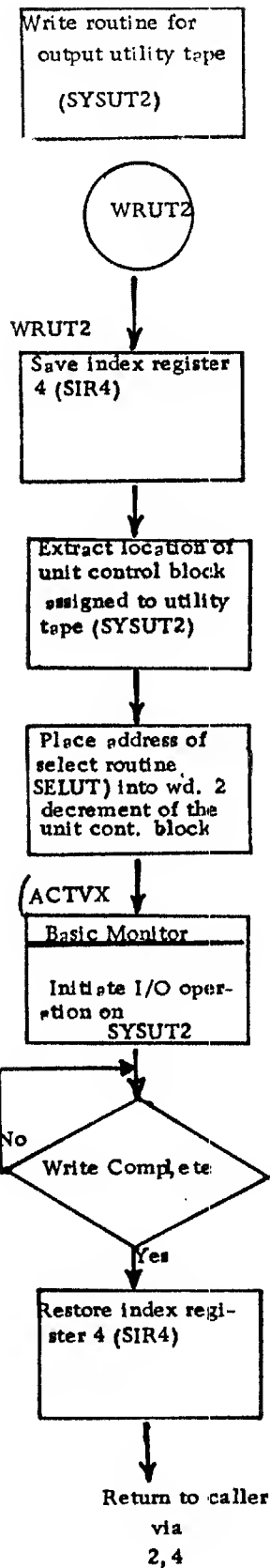




Select + & - routine  
for punch tape  
(SYSP1)

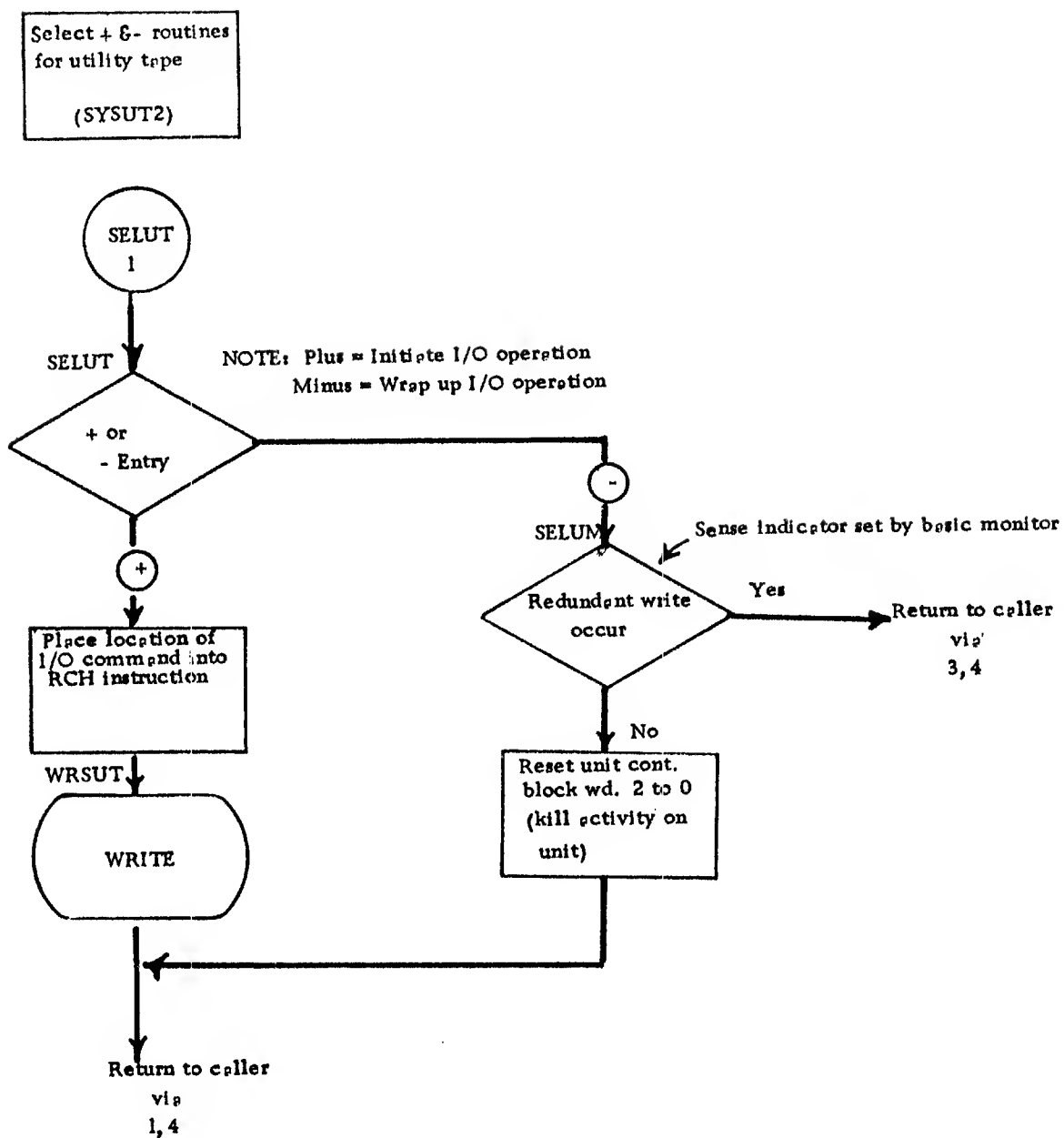


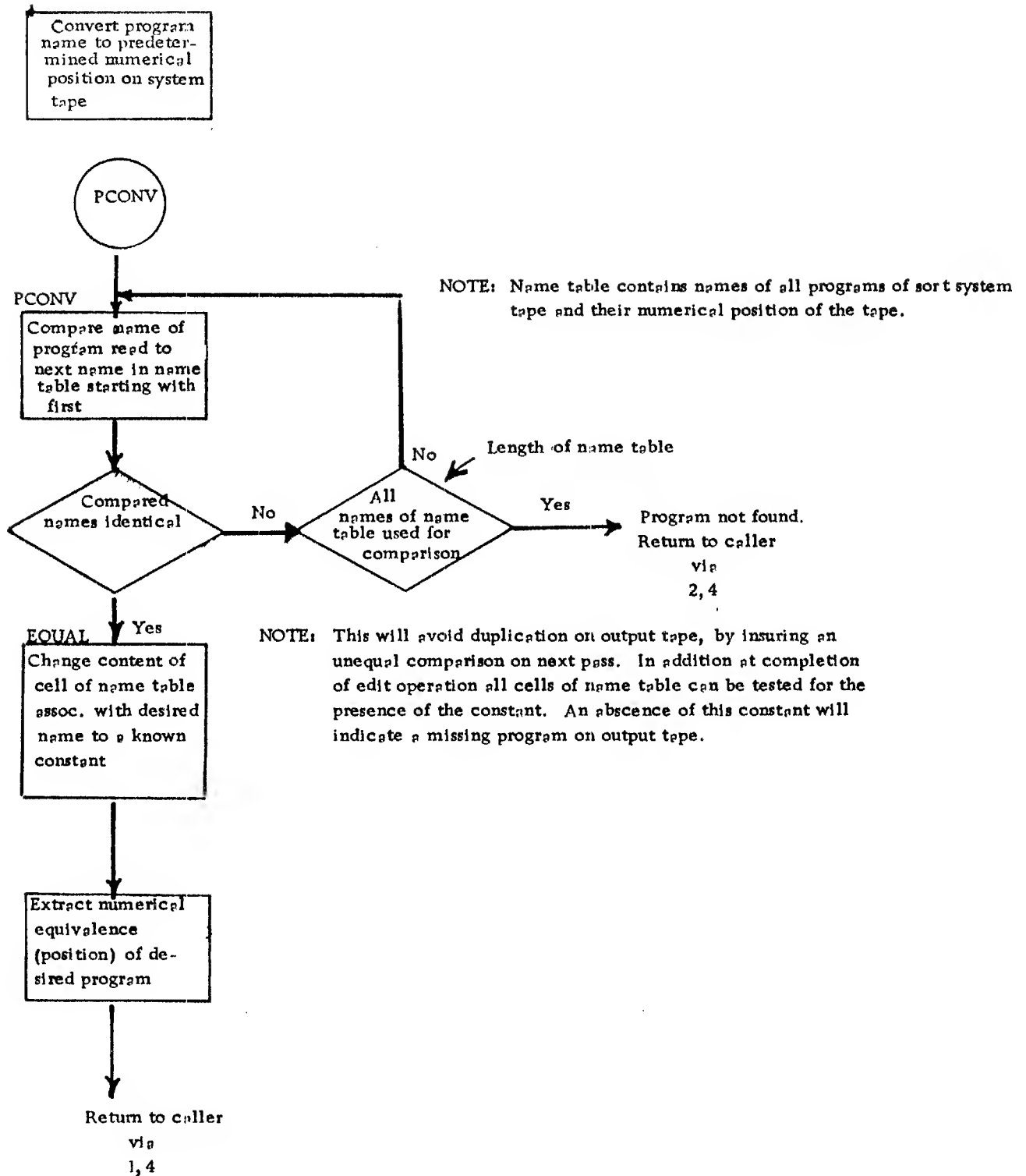


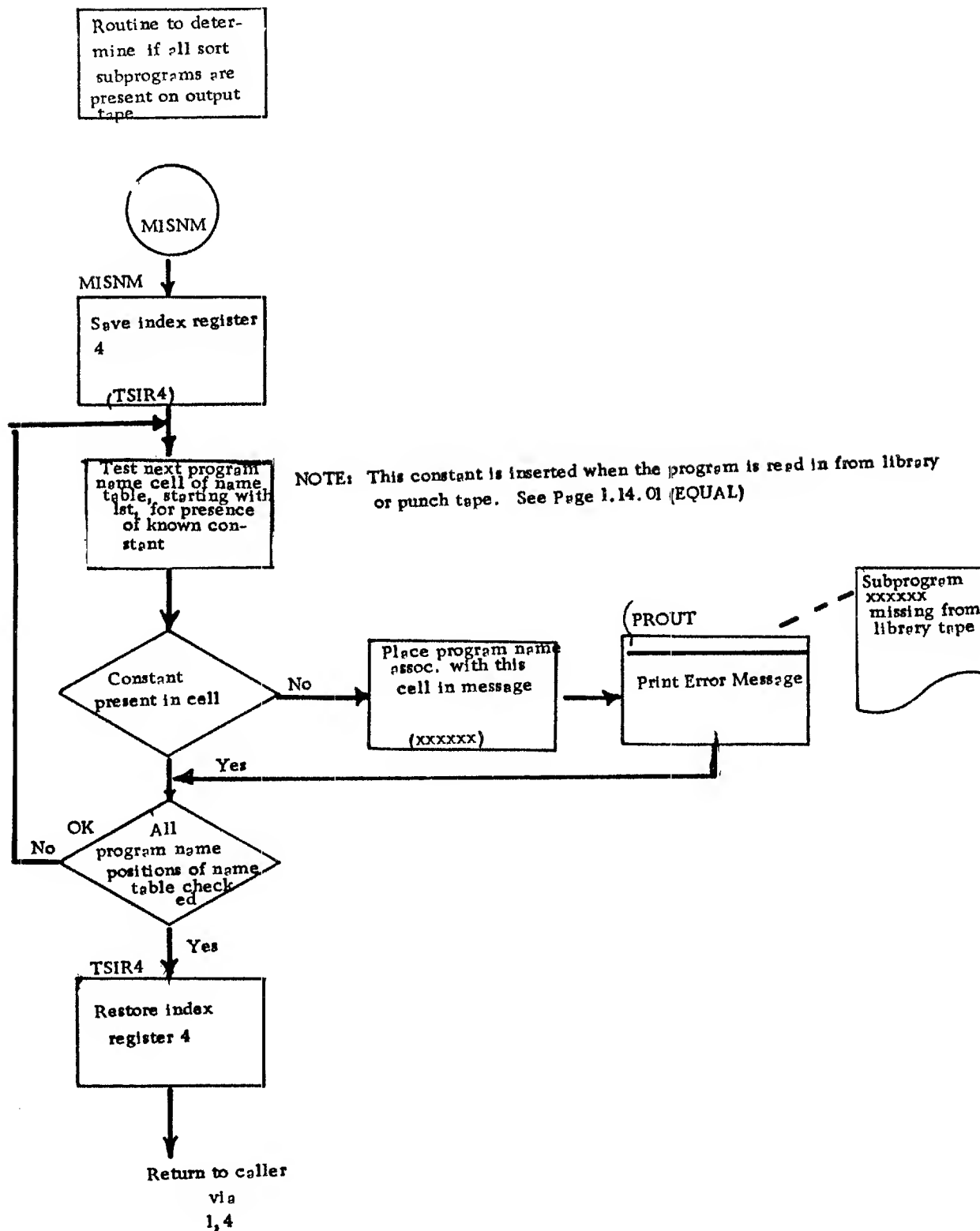


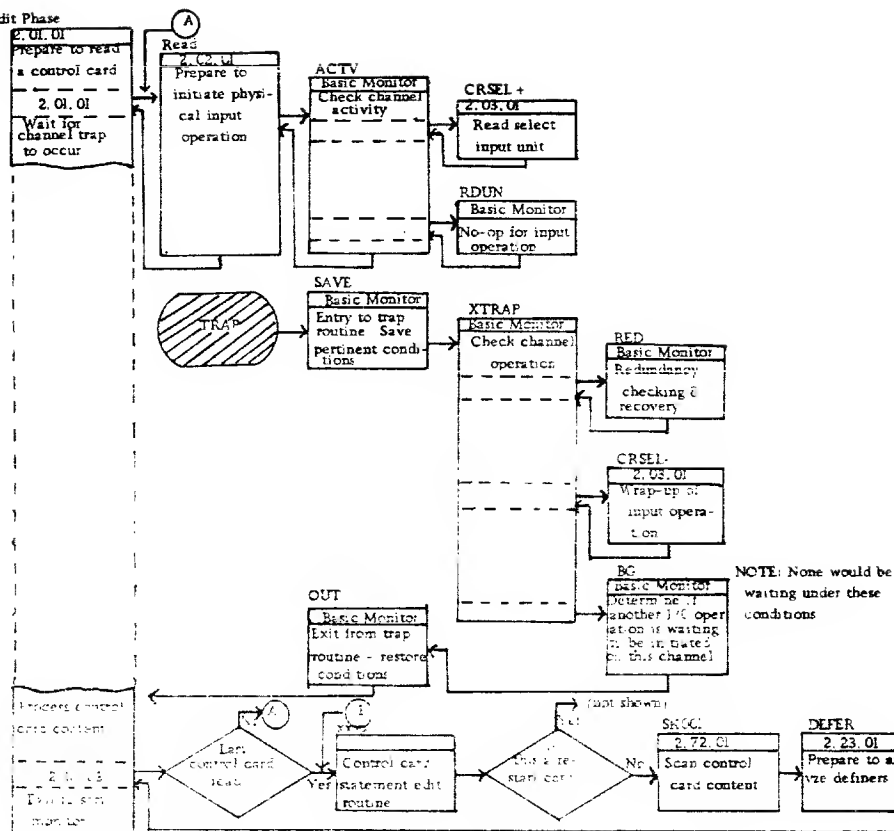
NOTE: Select routines on page 1.13.01







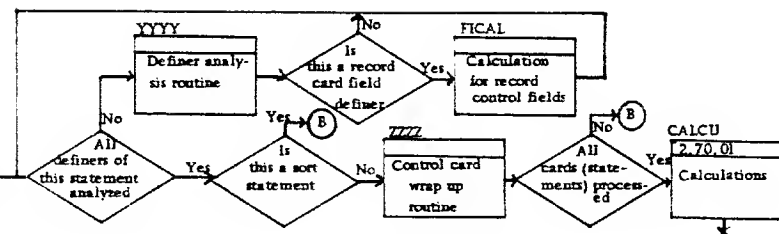




2.00.00

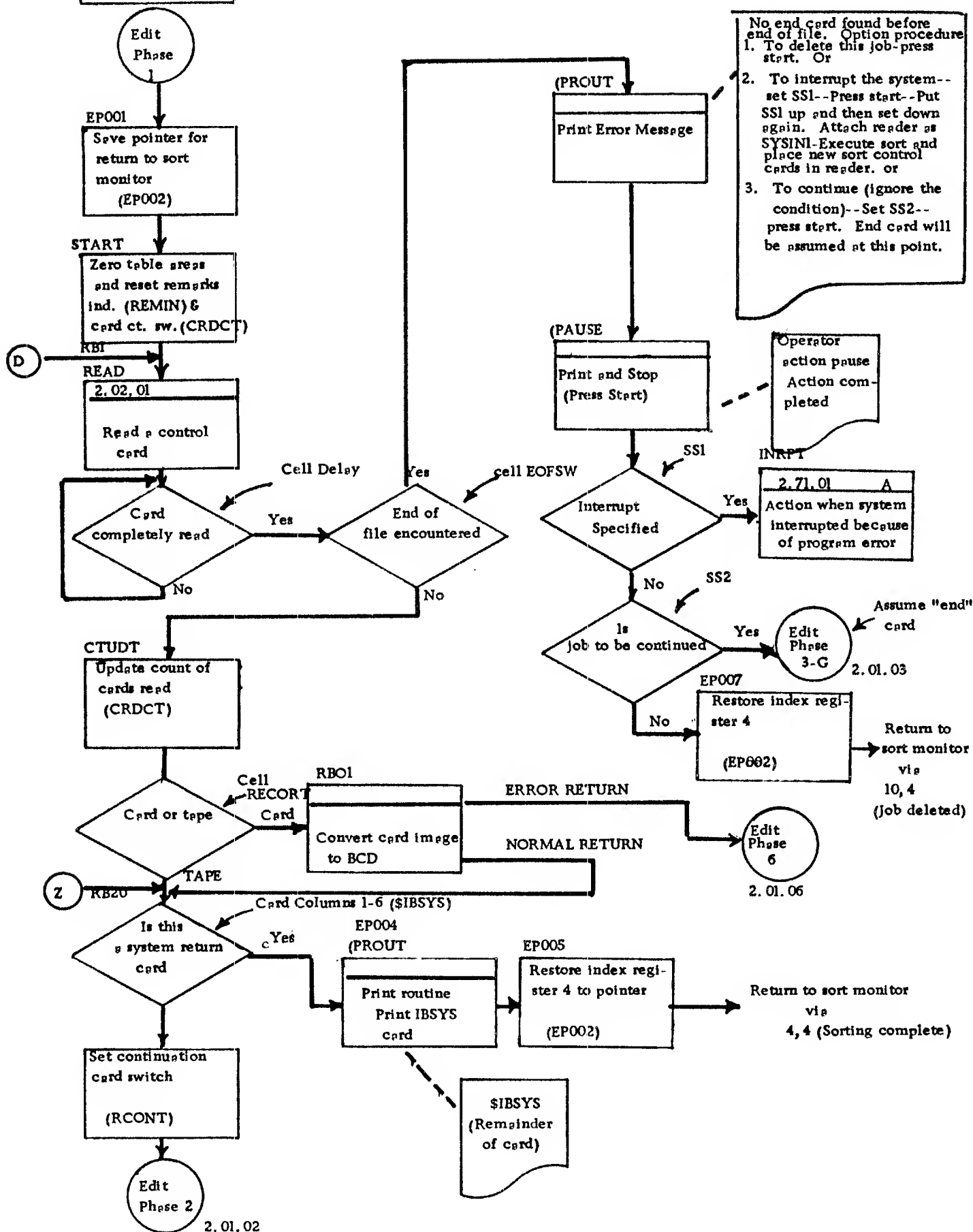
A. Entry is from and exit to the sort monitor  
B - Conditions:

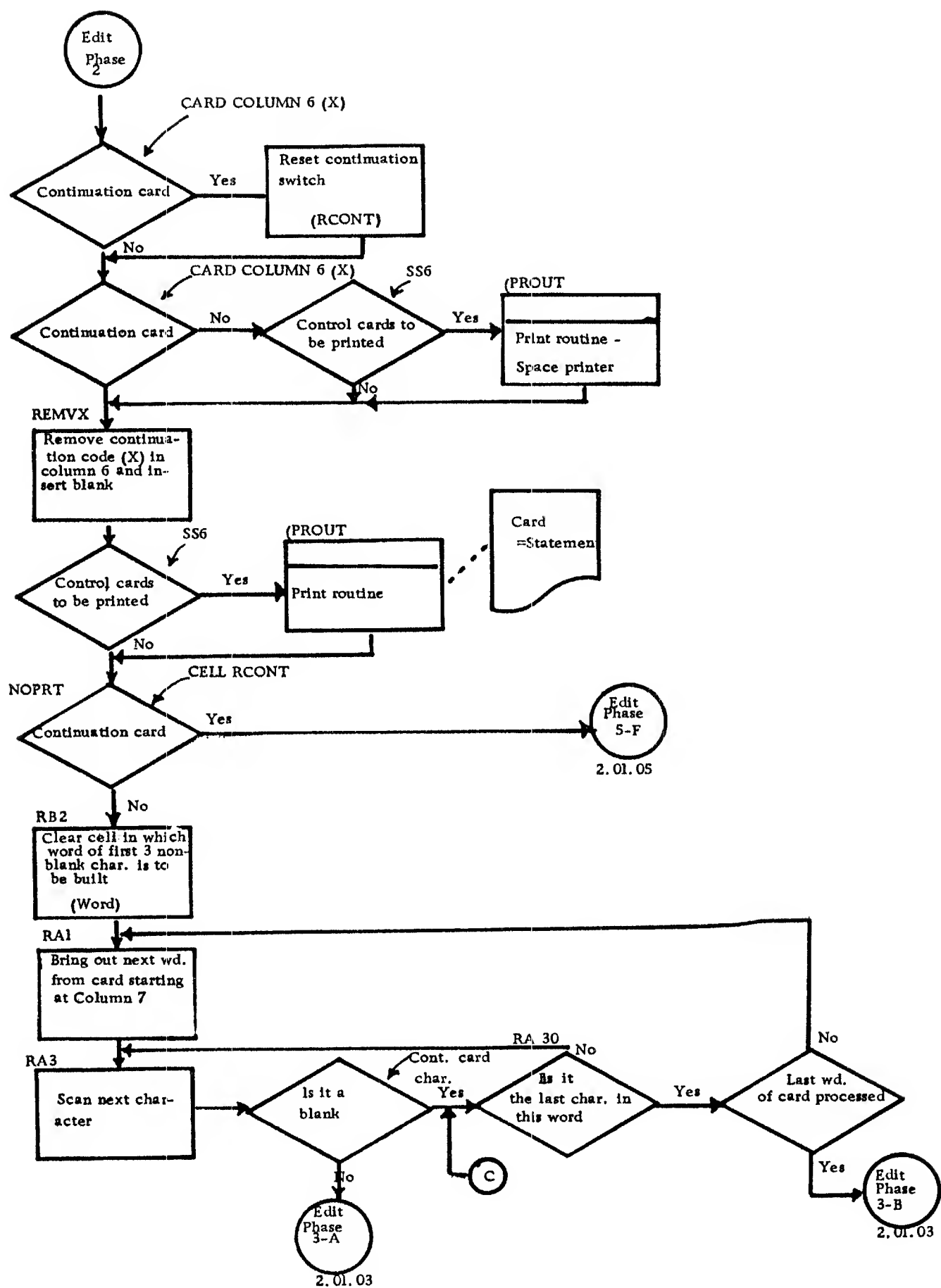
1. Control cards assumed - to be on tape
2. No error or end of file procedures shown.
3. Print and conversion routines not shown
4. Initial start assumed - restart not shown

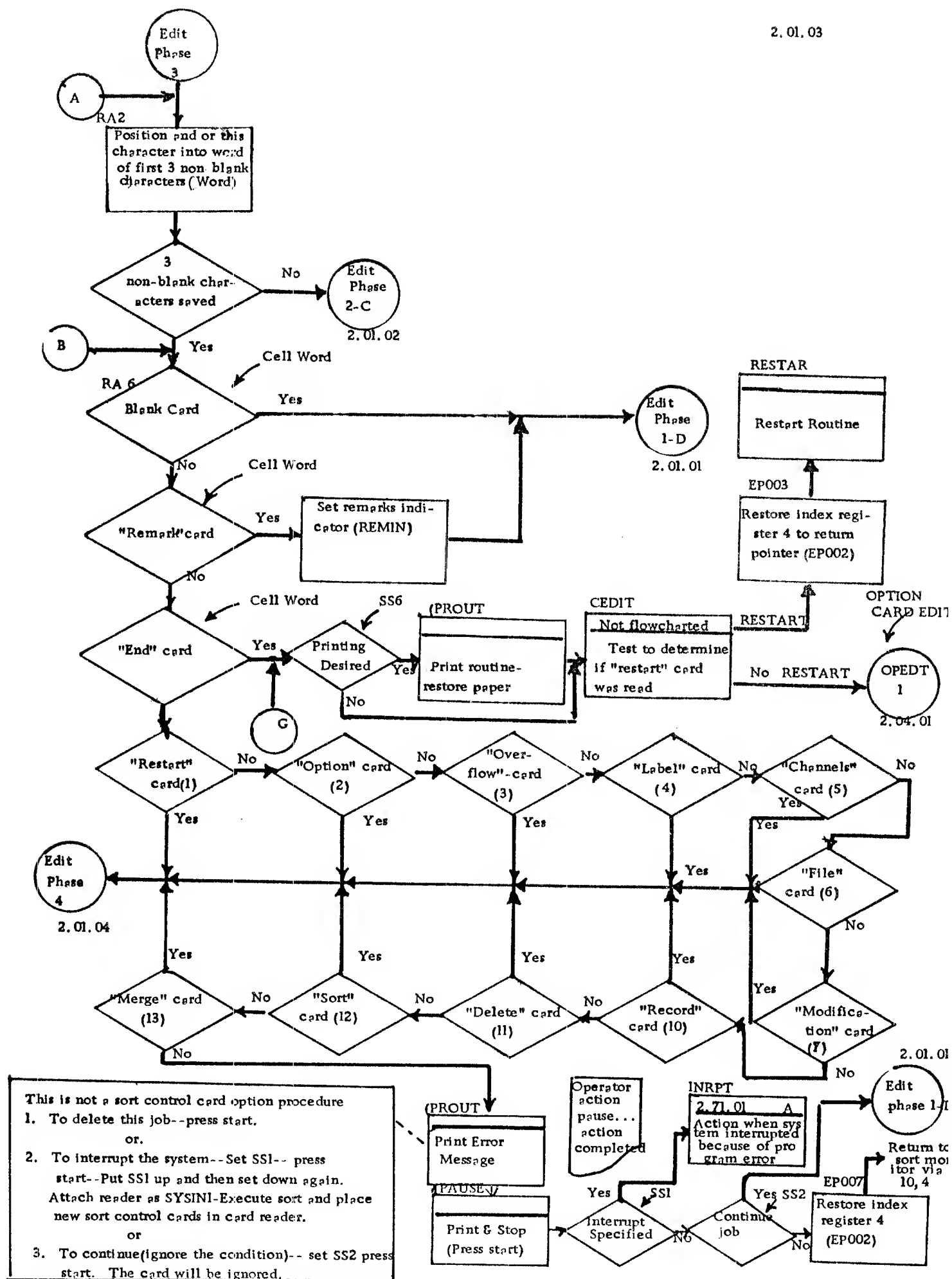


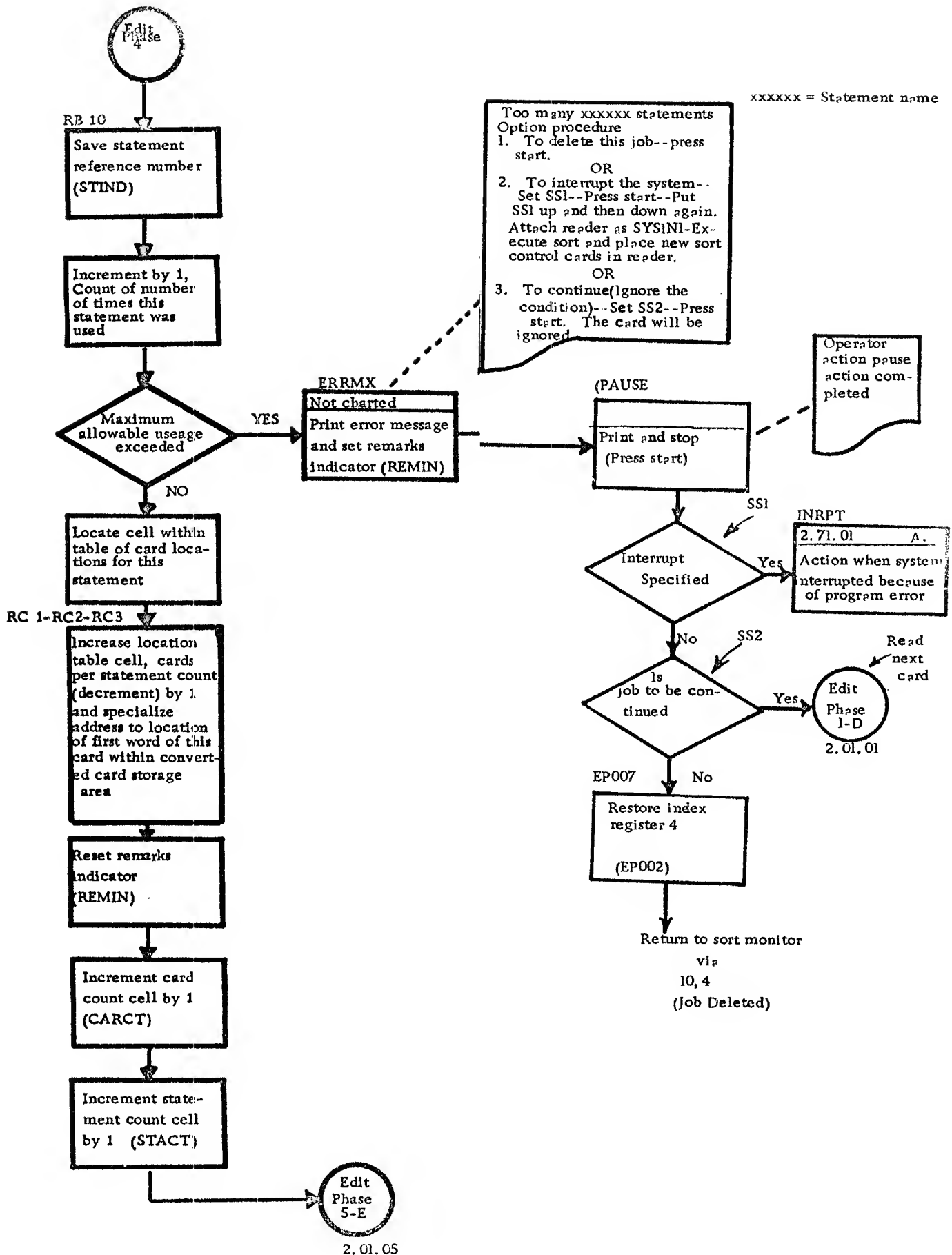
Source	Defect	XXID	Log Page	XXID	Log Page	ZZID	Log Page	
ENTR	CRKCHS	CHRT	2.04.01	-	CRKCHS	2.27.01	CHWR	2.05.01
	NOCH			-	NOCH	2.28.01		
	EQCHS			-	EQCHS	2.26.01		
	VECHS			-	VECHS	2.29.01		
	ERCHS			-	ERCHS	2.25.01		
	ERCHS			-	RECHS	2.23.01		
OVERCH	BLOC	OVCH	2.06.01	-	BLOC	2.30.01	OVWR	2.07.01
LABL	IDENTIFICATION	LABL	2.05.01	-	IDENT	2.31.01	LABWR	2.09.01
CHART		CHRT	2.08.01	-			CHWR	2.11.01
	RECH			-	RECH	2.32.01		
	MECH			-	MERCH	2.33.01		
	OUTCH			-	OUTCH	2.34.01		
FILE	REFS	REFS	2.12.01	-	REFS	2.35.01	FILE	2.13.01
	MODS			-	MODS	2.36.01		
	DETS			-	DETS	2.37.01		
	CRKCHS			-	CRKCHS	2.38.01		
	RECH			-	RECH	2.39.01		
	DIOT			-	DIOT	2.40.01		
	RETT			-	RETT	2.41.01		
	OUTCH			-	OUTCH	2.42.01		
	RETT			-	RETT	2.43.01		
	ERCHS			-	ERCHS	2.44.01		
	ERCHS			-	ERCHS	2.45.01		
	SERVI			-	SERVI	2.46.01		

State ment	De fine r	XXXX	Logic Page	YYYY	Logic Page	ZZZZ	Logic Page
FILE (cont.)	LABEL	-	-	LABEL	2.47.01	-	-
	RISW3	-	-	RISW3	2.48.01	-	-
	NAME	-	-	NAME1	2.49.01	-	-
	CKPT	-	-	CKPT1	2.50.01	-	-
	RECORD	-	-	RECF1	2.51.01	-	-
MODIFICATION	PROGRAM	MODDT	2.14.01	PROMO	2.52.01	MODWB2	2.15.01
	CELLS	-	-	CELMO	2.53.01	-	-
RECORD	REEDT	2.16.01	-	-	-	RECWR	2.17.01
	TYPE	-	-	TYPER	2.54.01	-	-
	LENGTH	-	-	LENRE	2.55.01	-	-
	FIELD	-	-	FIERE	2.56.01	-	-
DELETE	DEEDT	2.18.01	-	-	-	DELWR	2.19.01
	TYPE	-	-	TYPDE	2.58.01	-	-
	FIELD	-	-	FIEDE	2.59.01	-	-
	IDENTIFICATION	-	-	IDIDE	2.60.01	-	-
SORT	SOEDT	2.20.01	-	-	-	-	-
	ORDER	-	-	ORDSO	2.61.01	-	-
	SEQUENCE	-	-	SEOSO	2.62.01	-	-
	FILE	-	-	FIISO	2.63.01	-	-
	FIELD	-	-	FIESO	2.64.01	-	-
MERGE	MEDDT	2.21.01	-	-	-	SMWRP	2.22.01
	ORDER	-	-	ORDMR	2.65.01	-	-
	SEQUENCE	-	-	SEOMR	2.66.01	-	-
	FILE	-	-	FIAMR	2.67.01	-	-
	FIELD	-	-	FIEMR	2.68.01	-	-

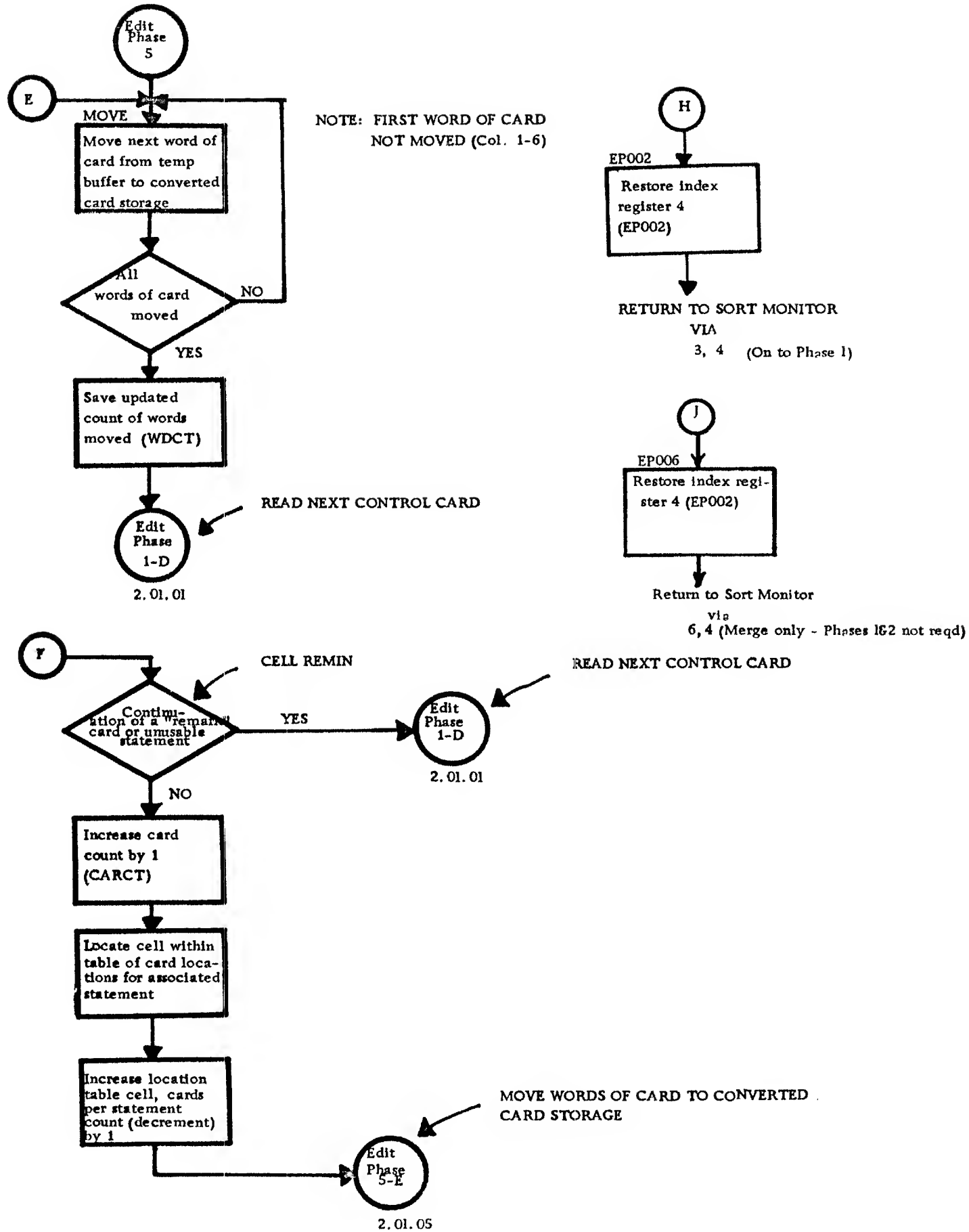


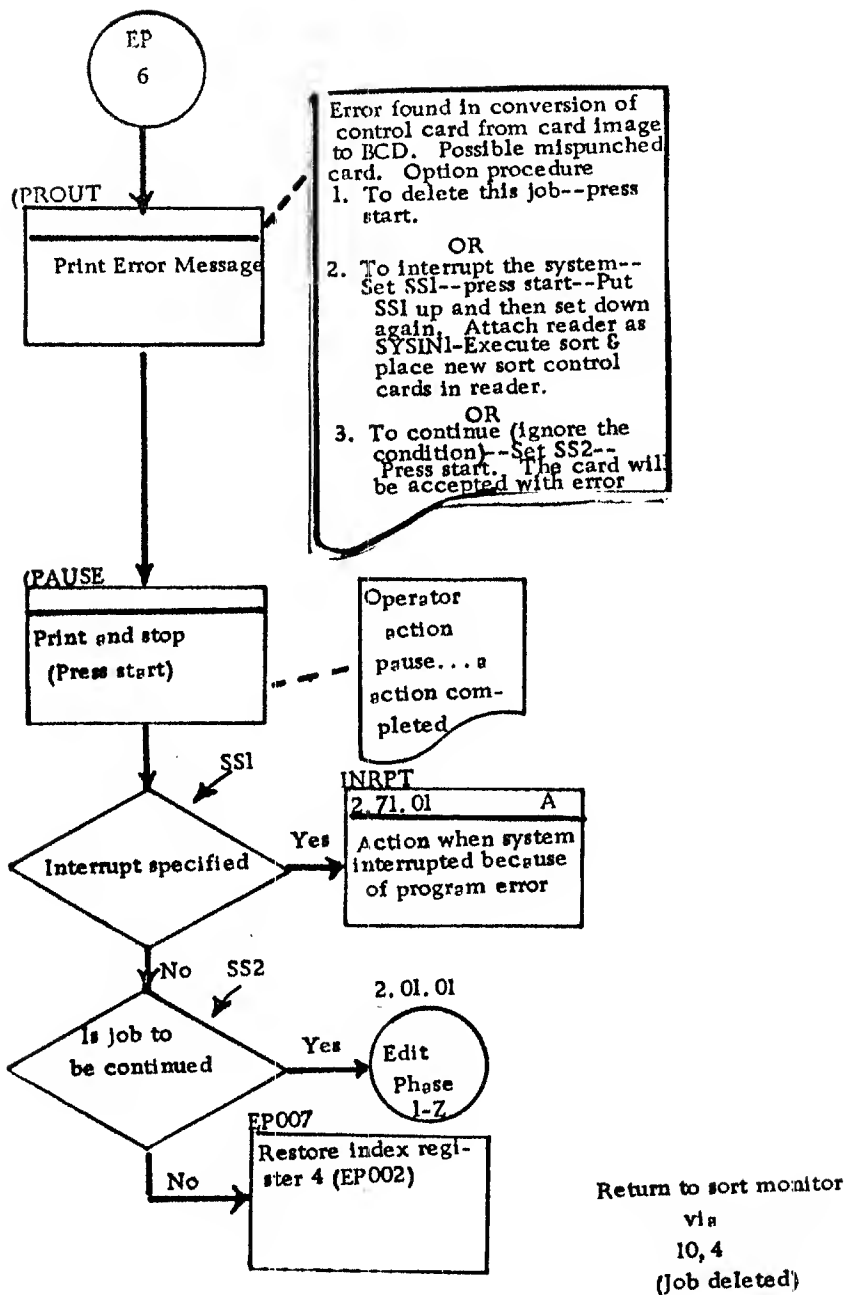


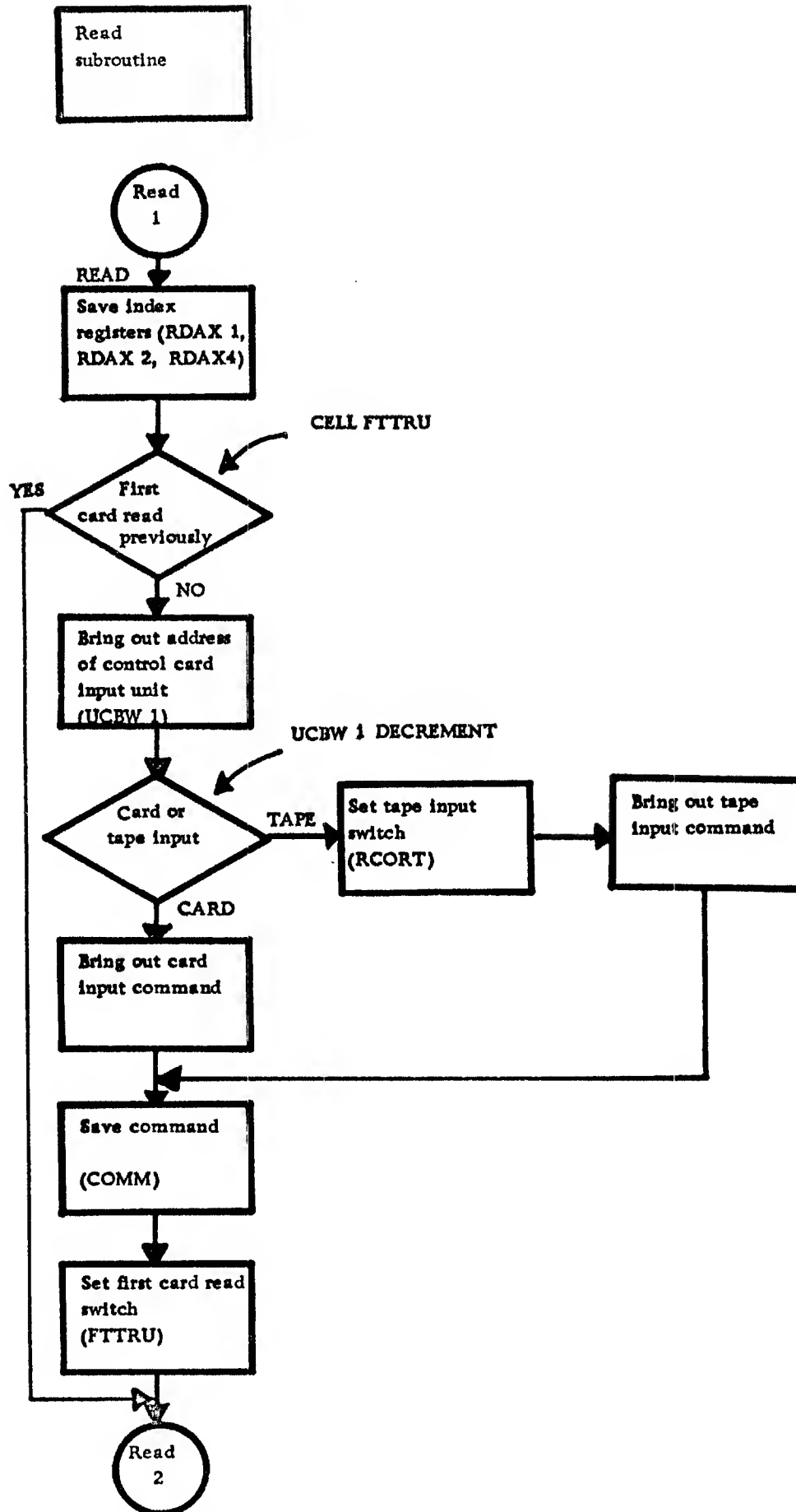


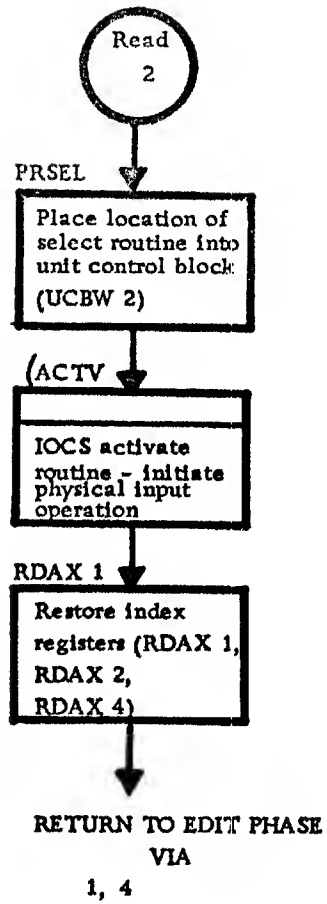


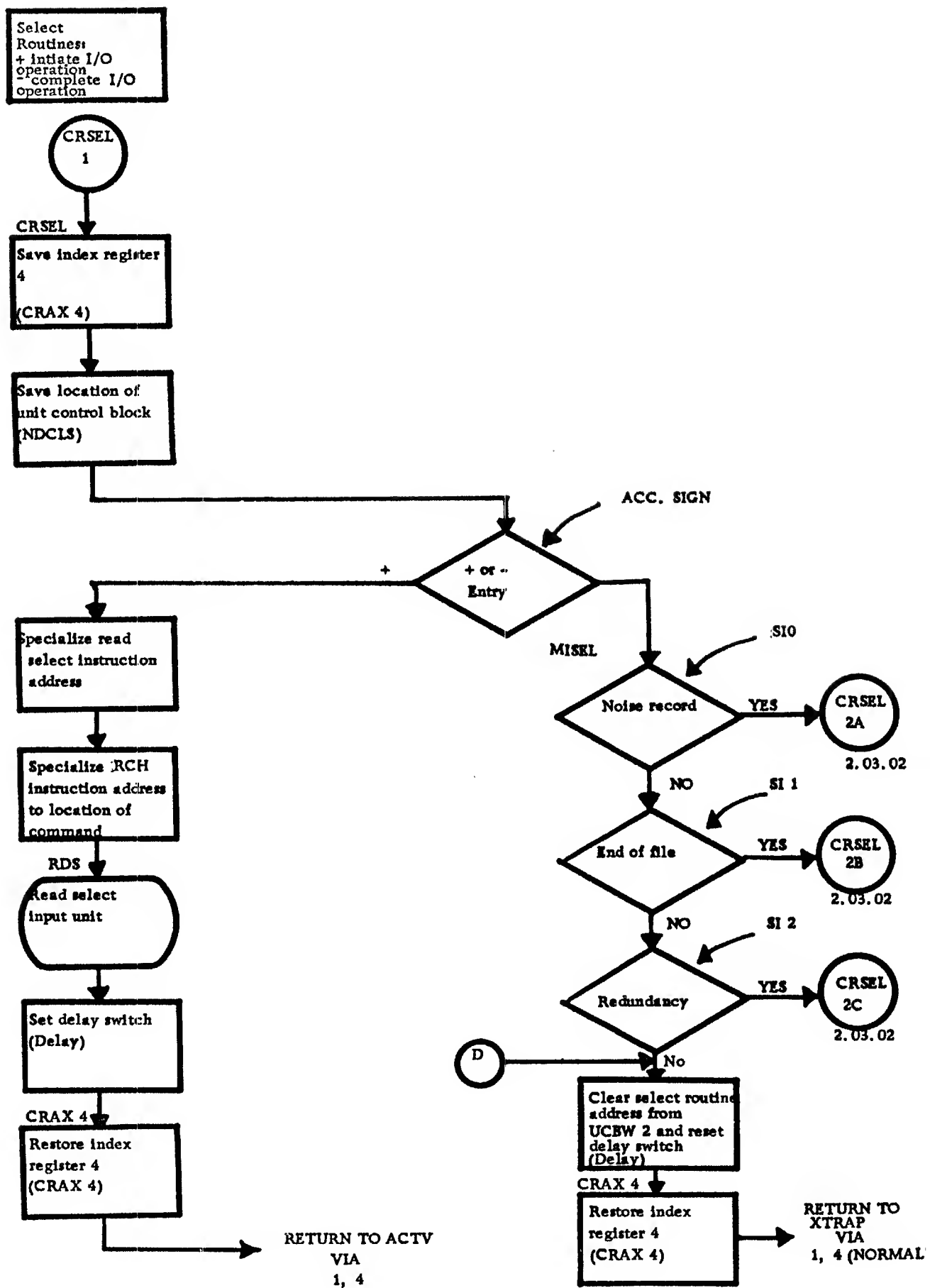


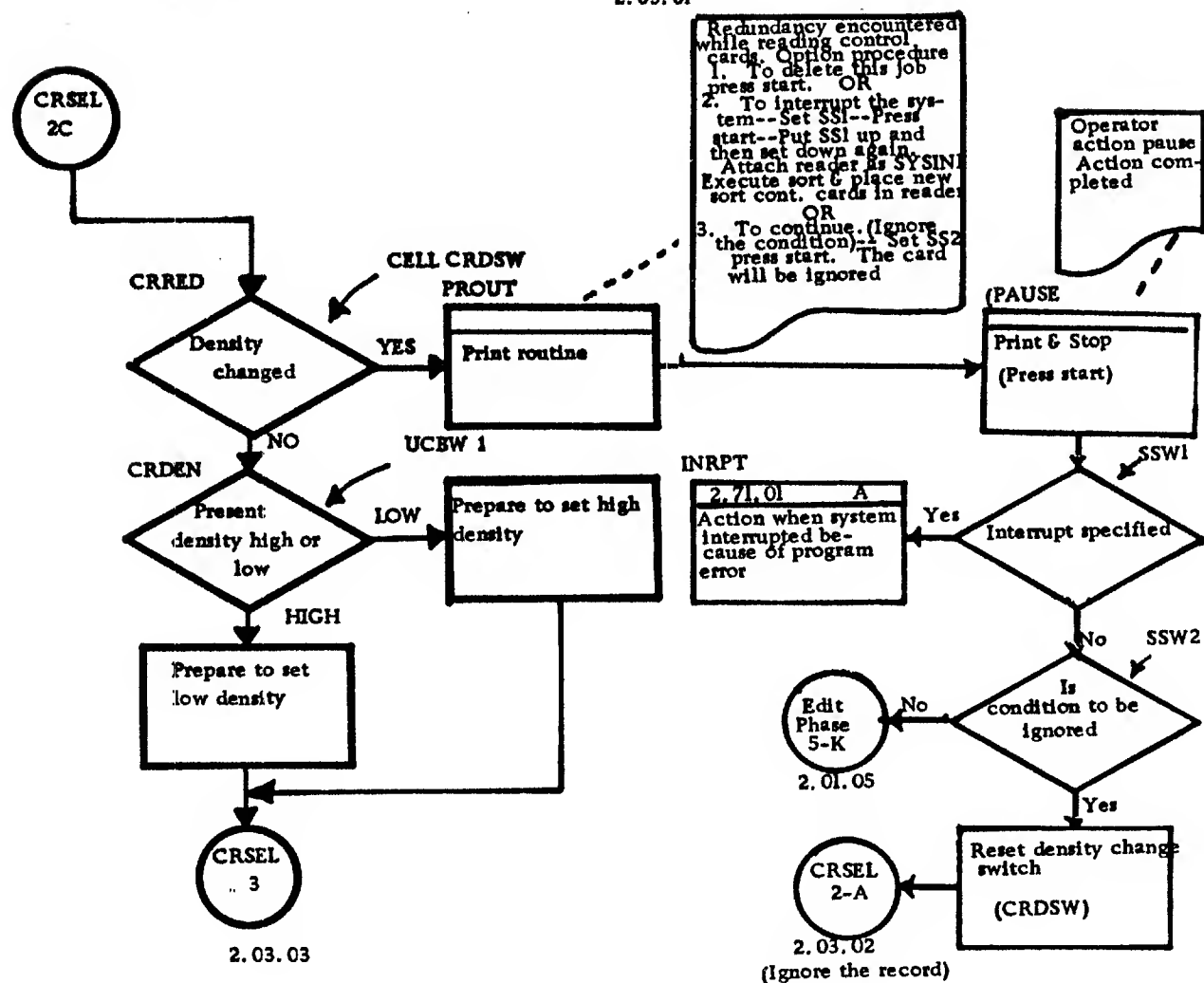
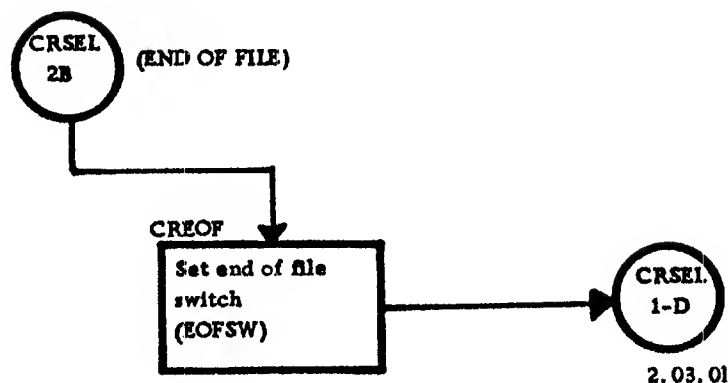
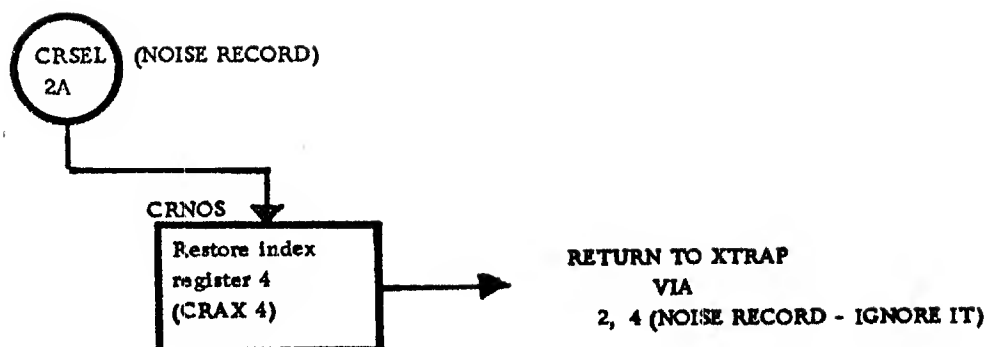


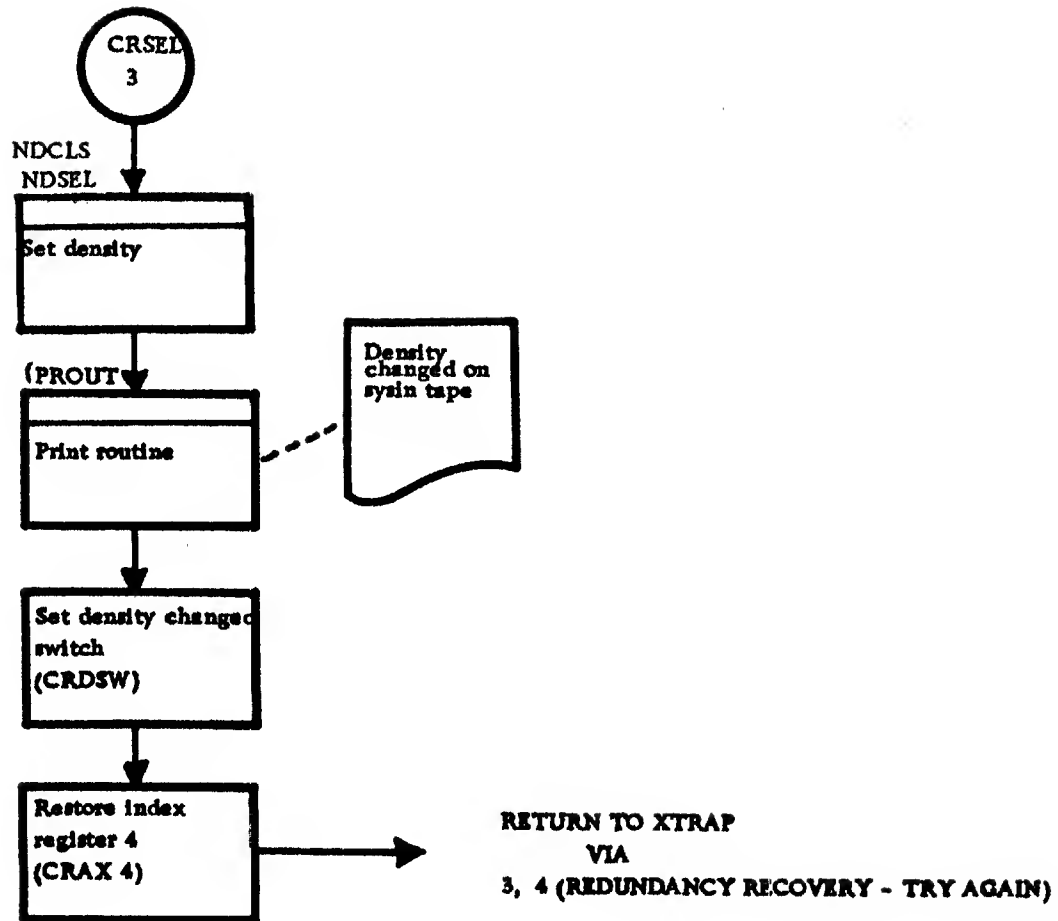


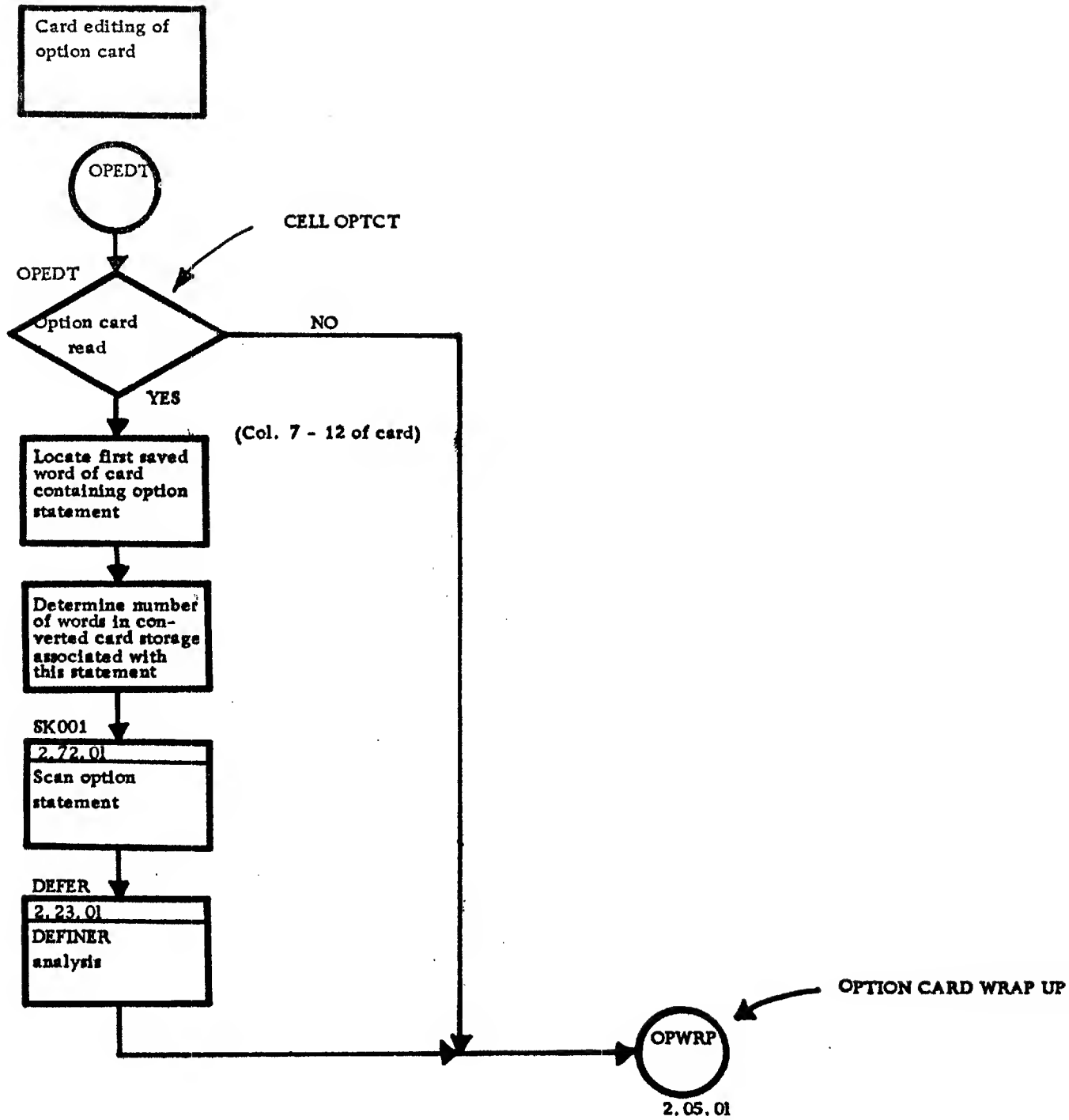














Wrap up of  
option card

OPWRP

OPWRP

Compute location  
of high end of  
new relocated  
common area per  
relcom definer

Clear 5000<sub>10</sub> cells  
for common area

NOTE: OPTPR = OPTION CARD PARAMETERS

Place number of  
cells common re-  
located into  
common  
(OPTPR)

Place condition of  
each remaining  
option card definer  
switch into common  
(OPTPR-1 thru  
OPTPR-5)

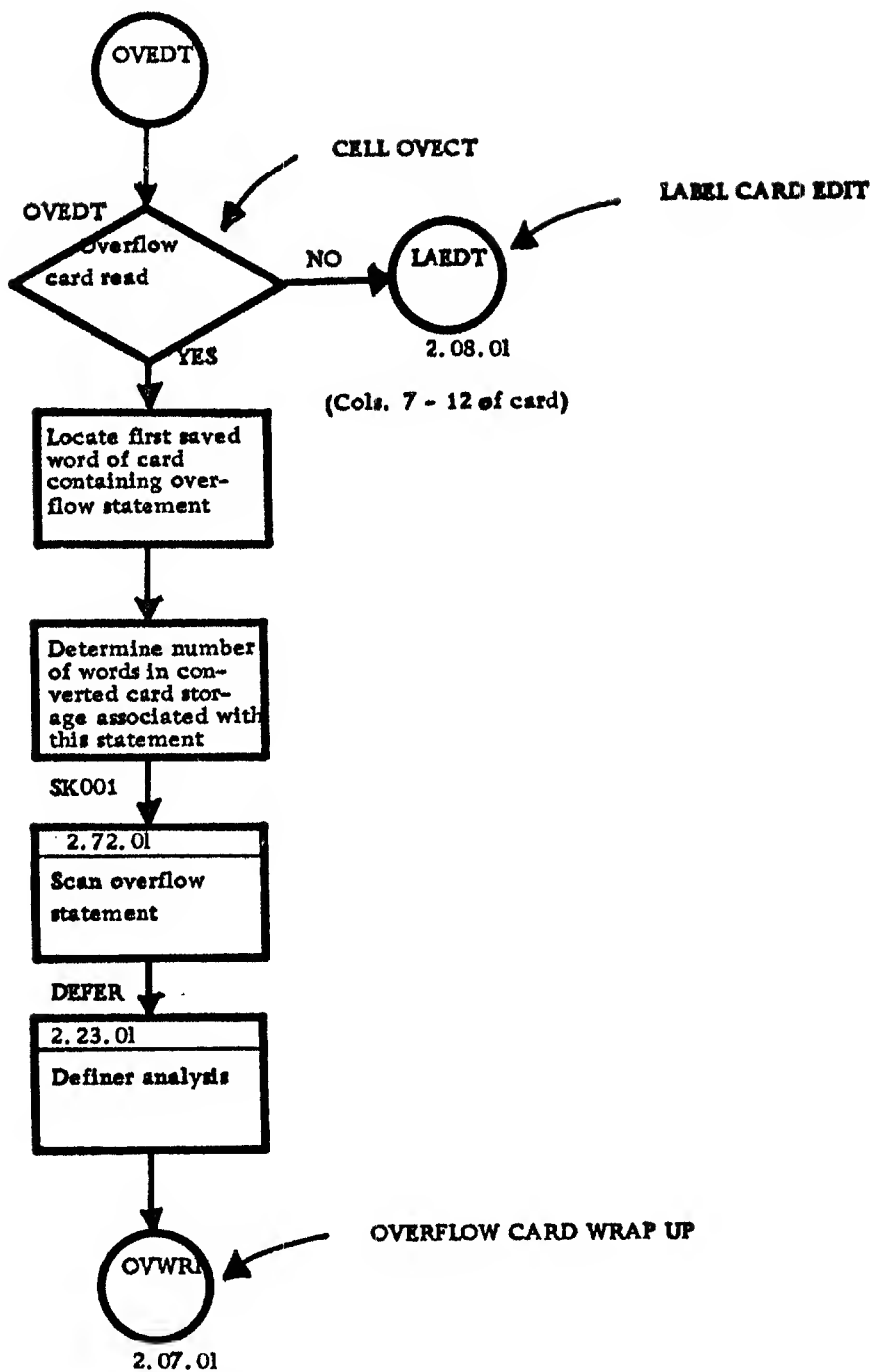
REFPR = REFERENCED PARAMETERS PARAMETER CELL

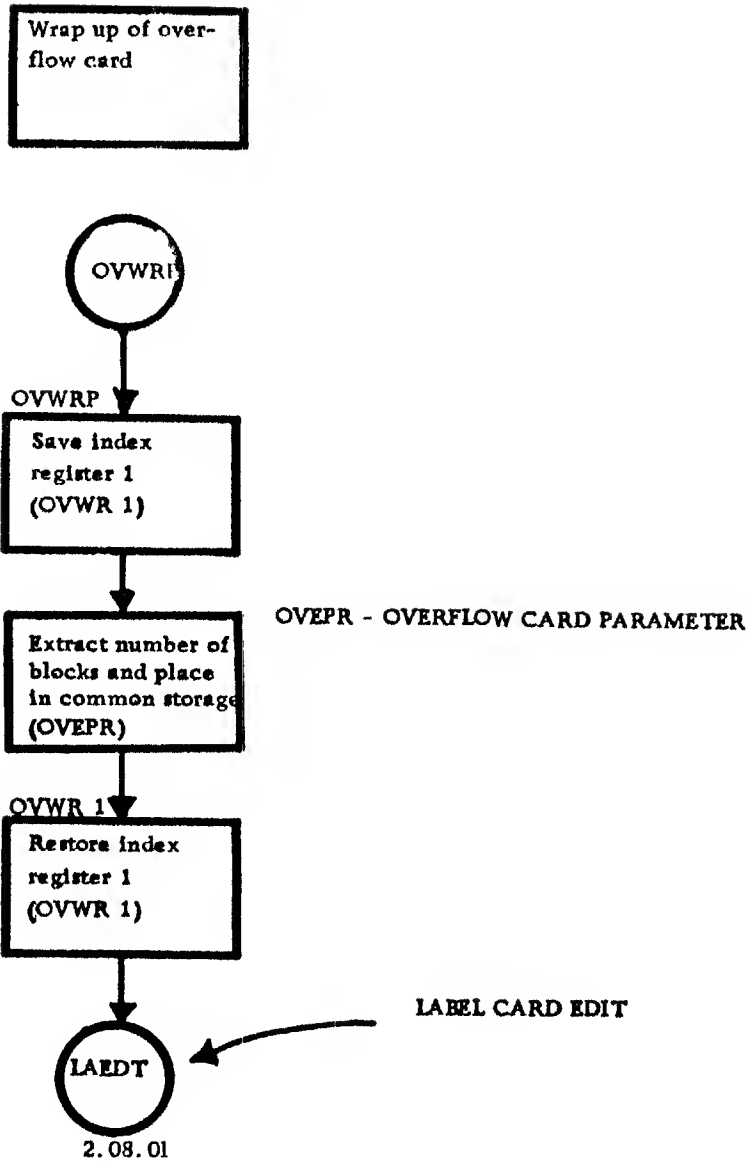
Place into the last  
fixed location of  
common the loca-  
tion of itself - 1  
(REFPR)

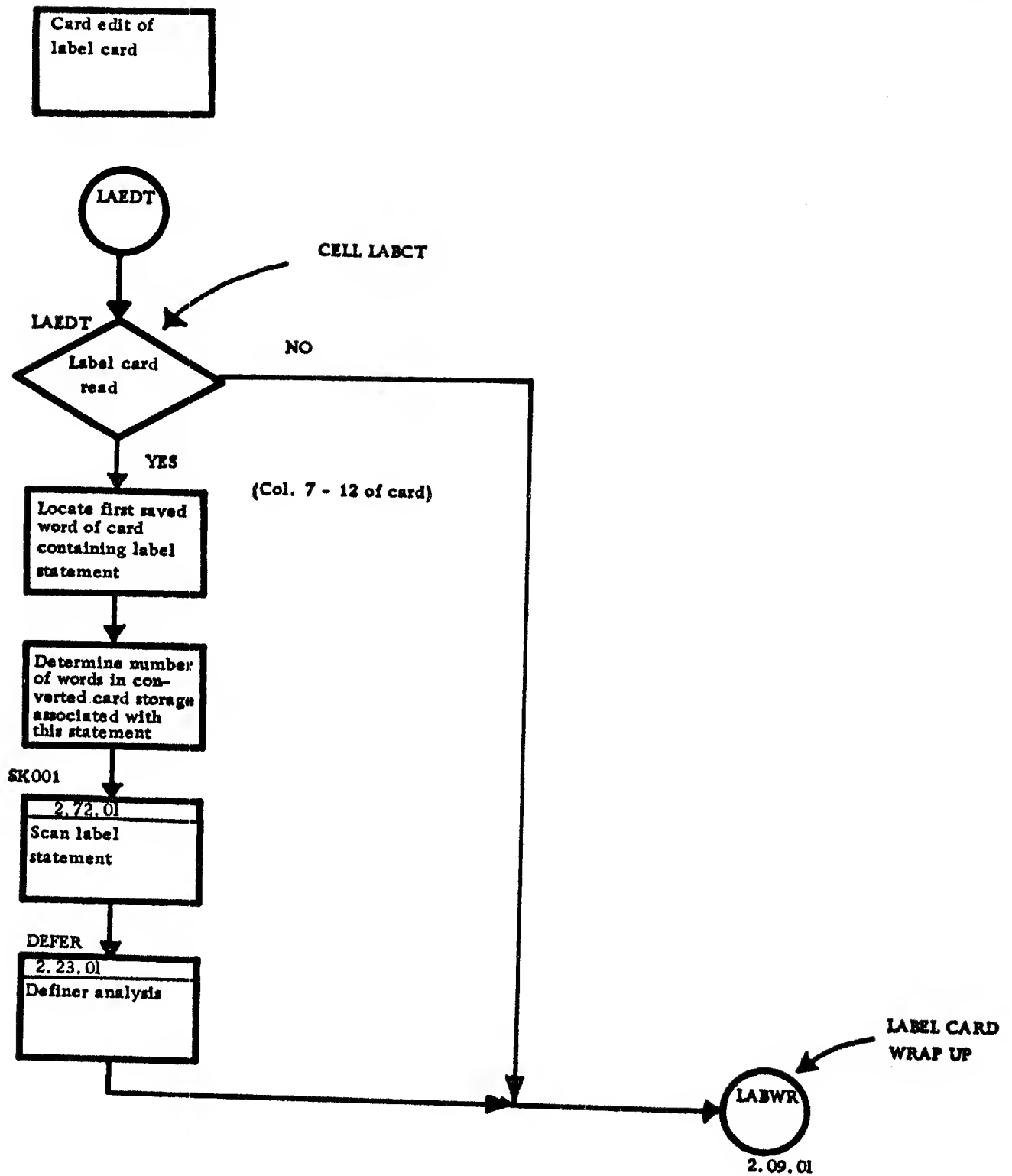
OVERFLOW CARD EDIT

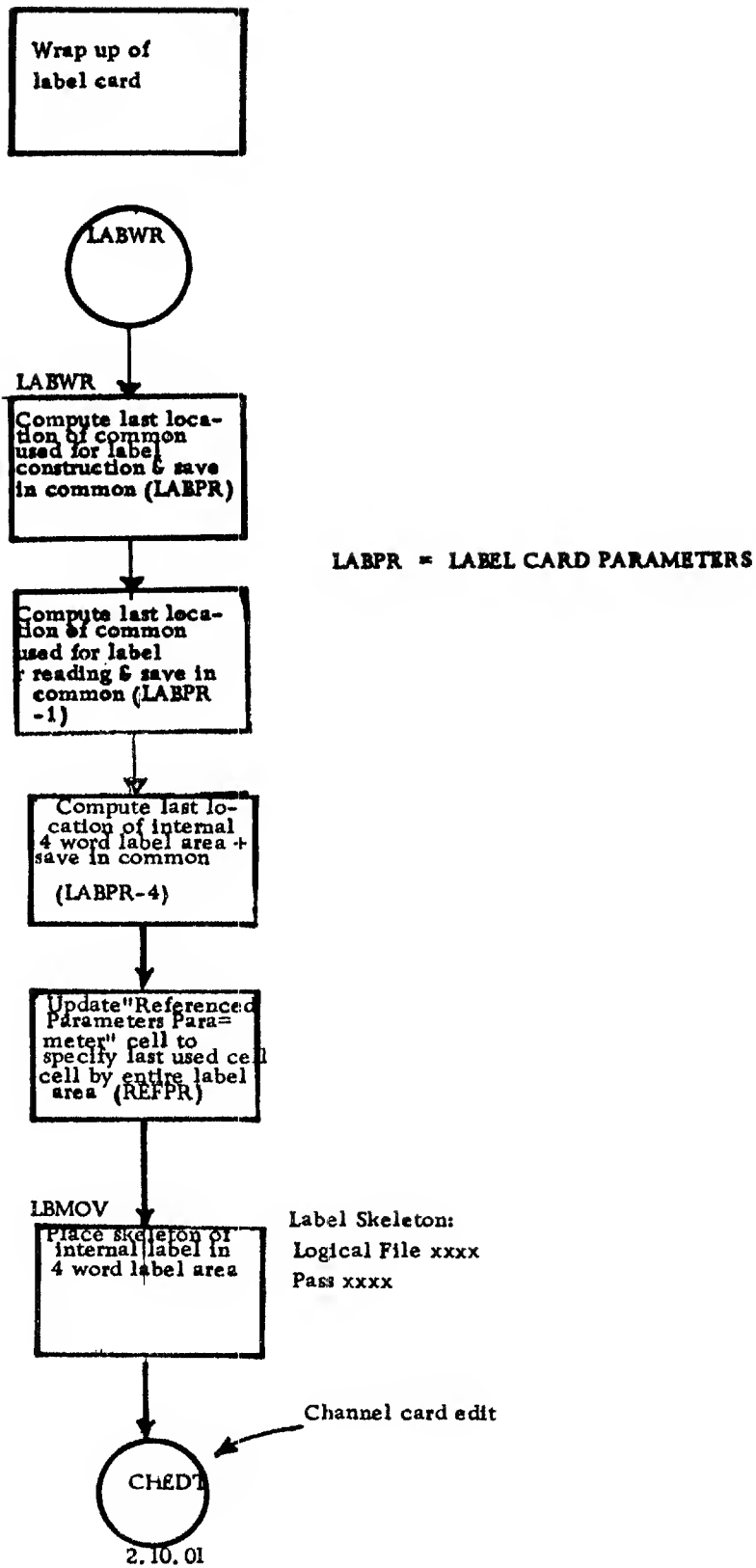
OVERFLOW

Card edit of over-  
flow card

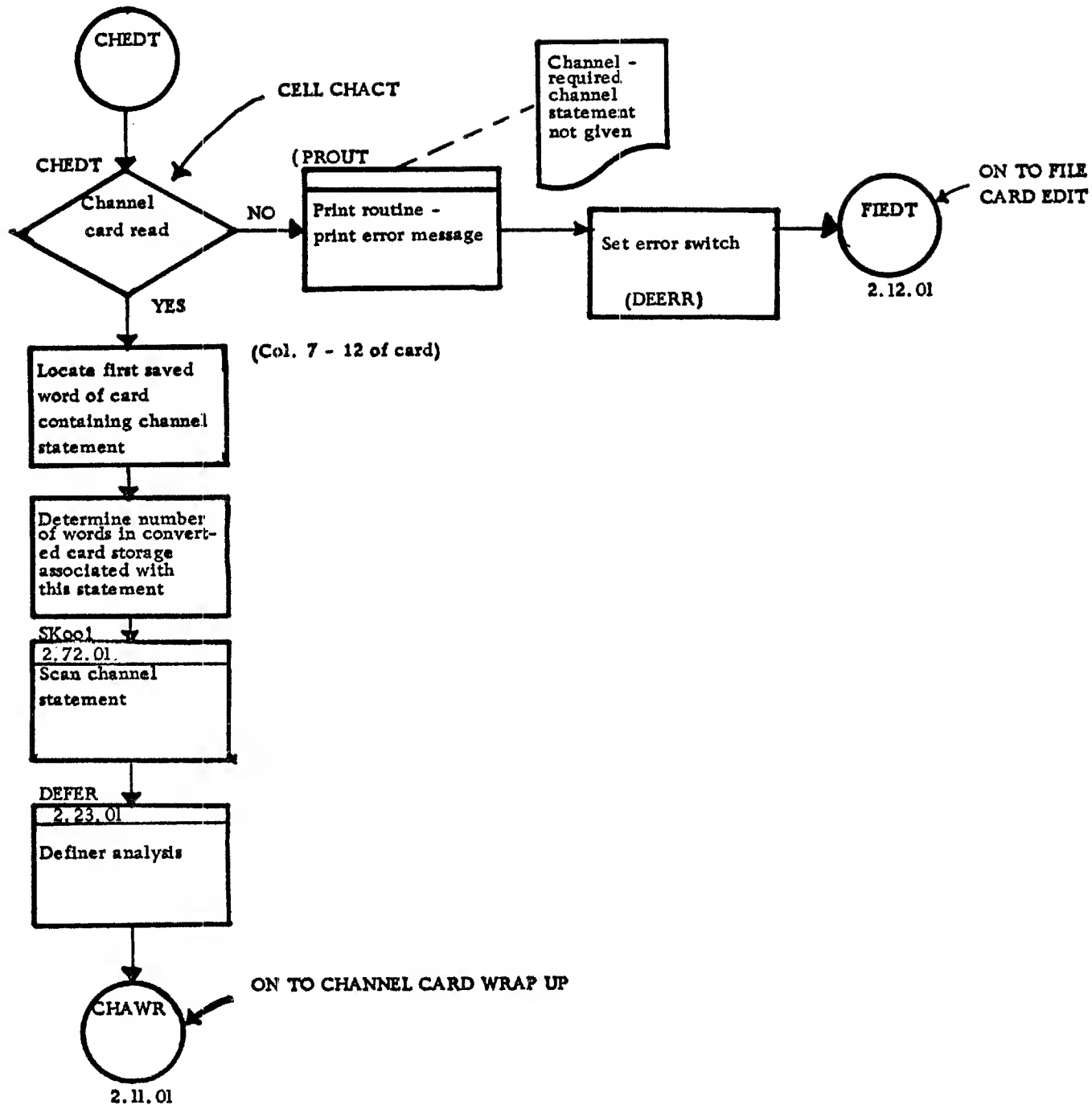


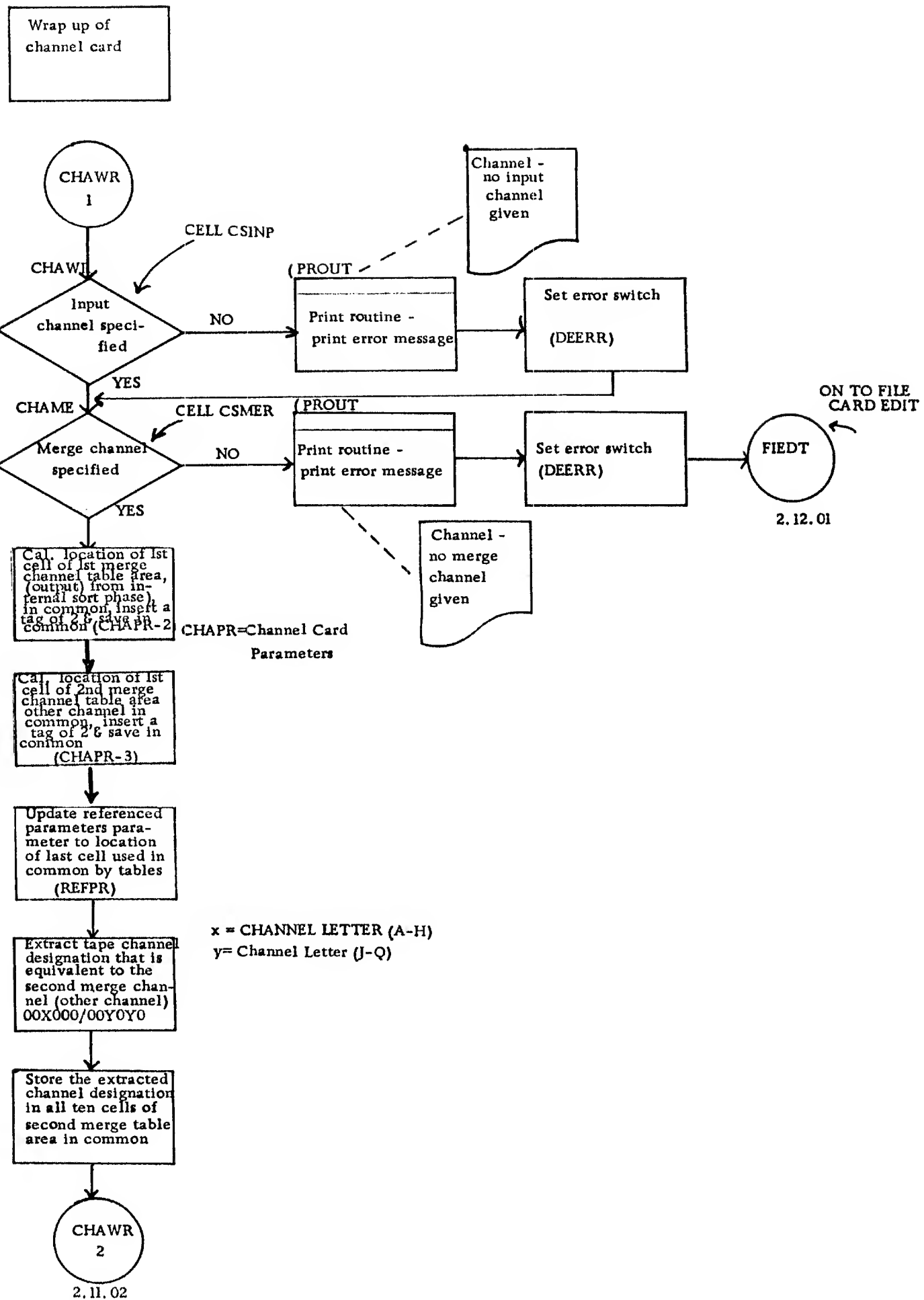


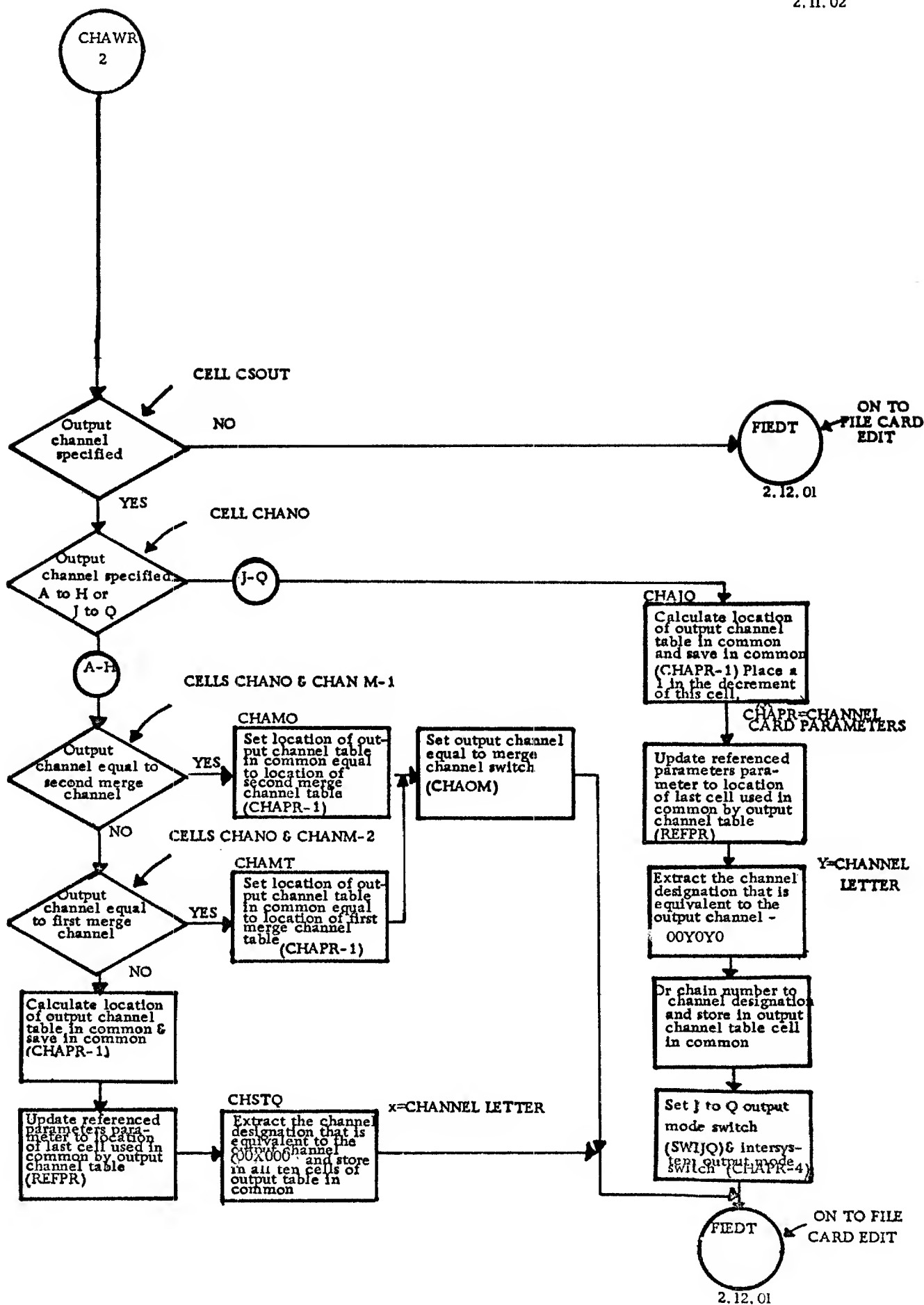




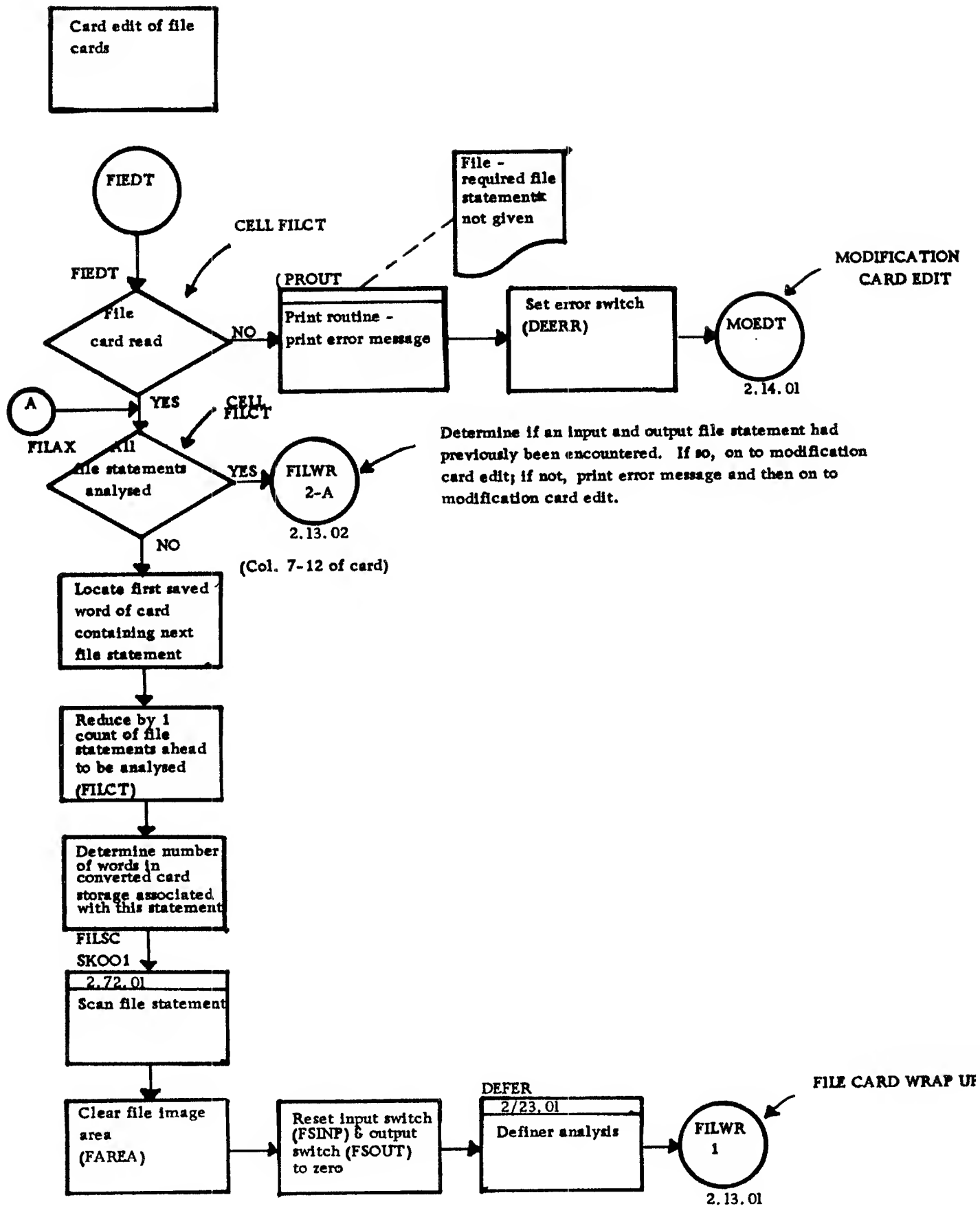
Card edit of  
channel card

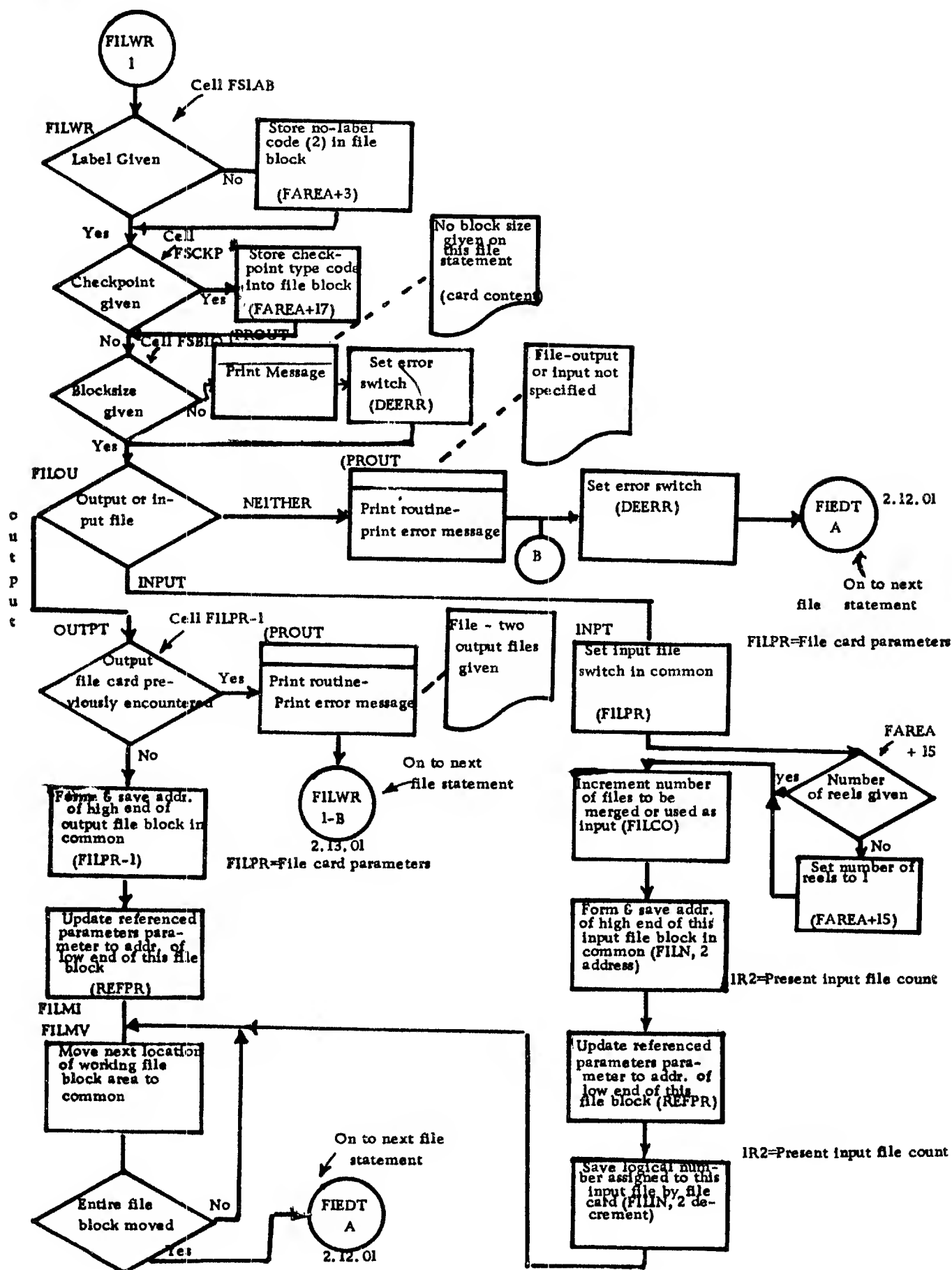


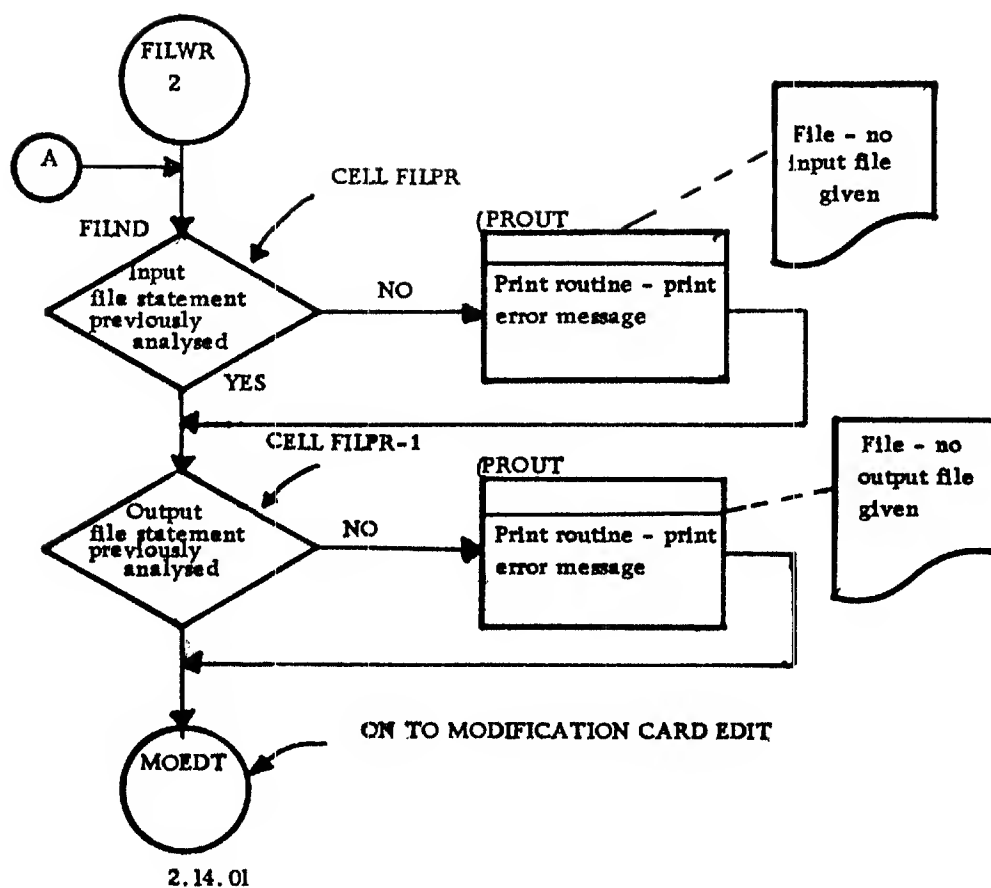






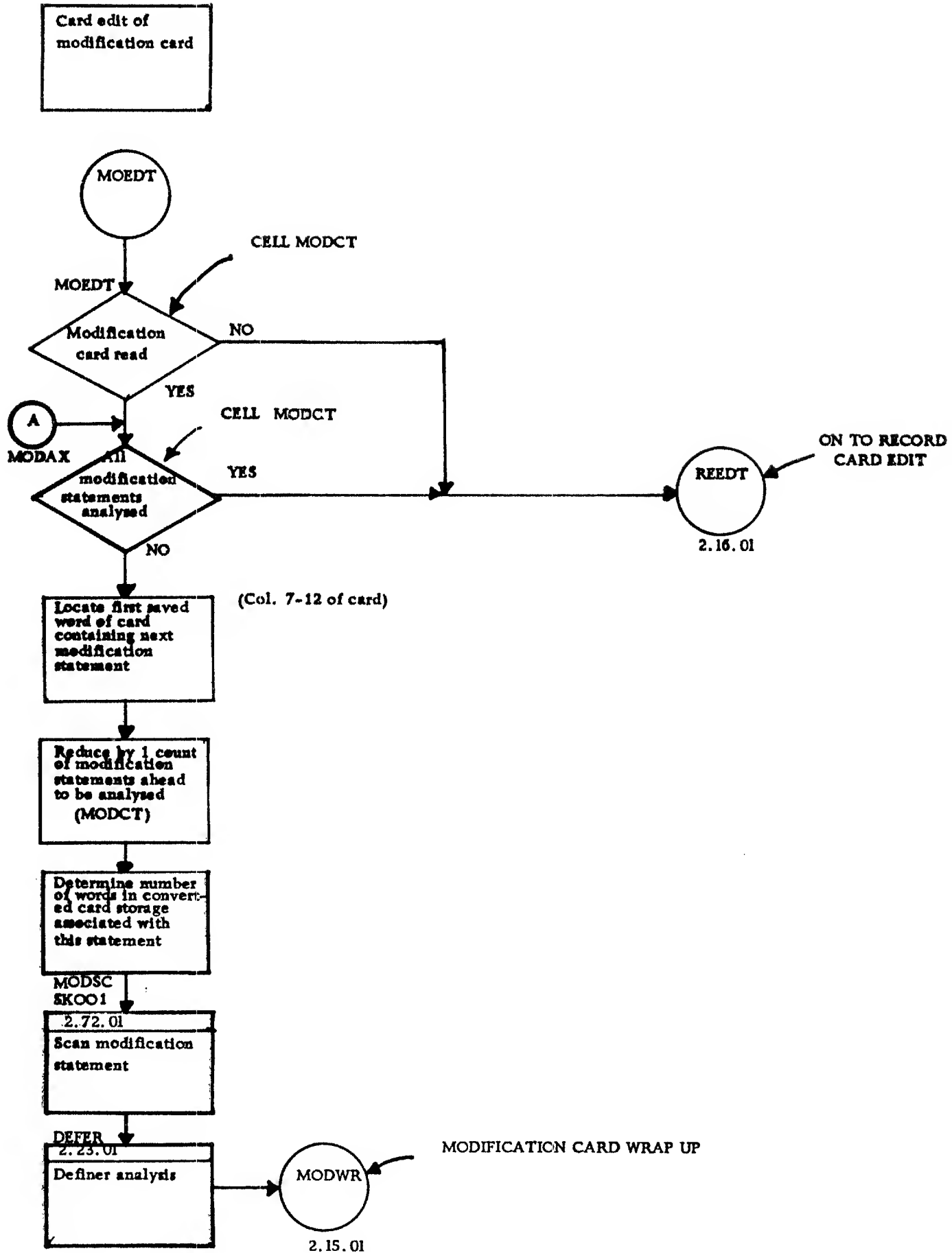


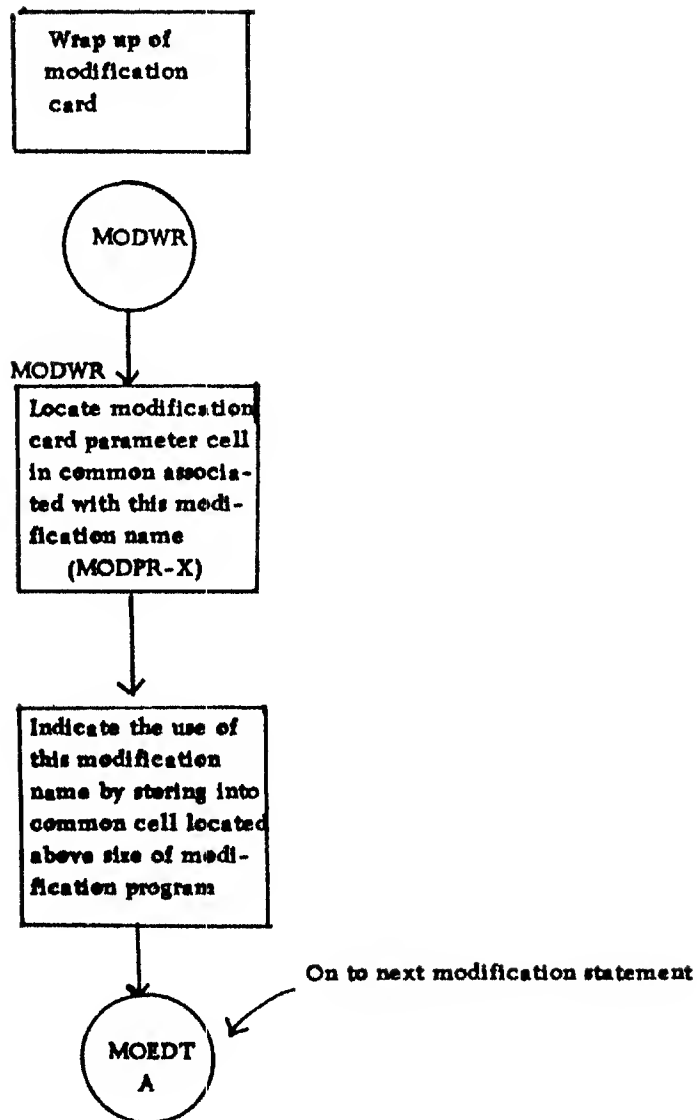


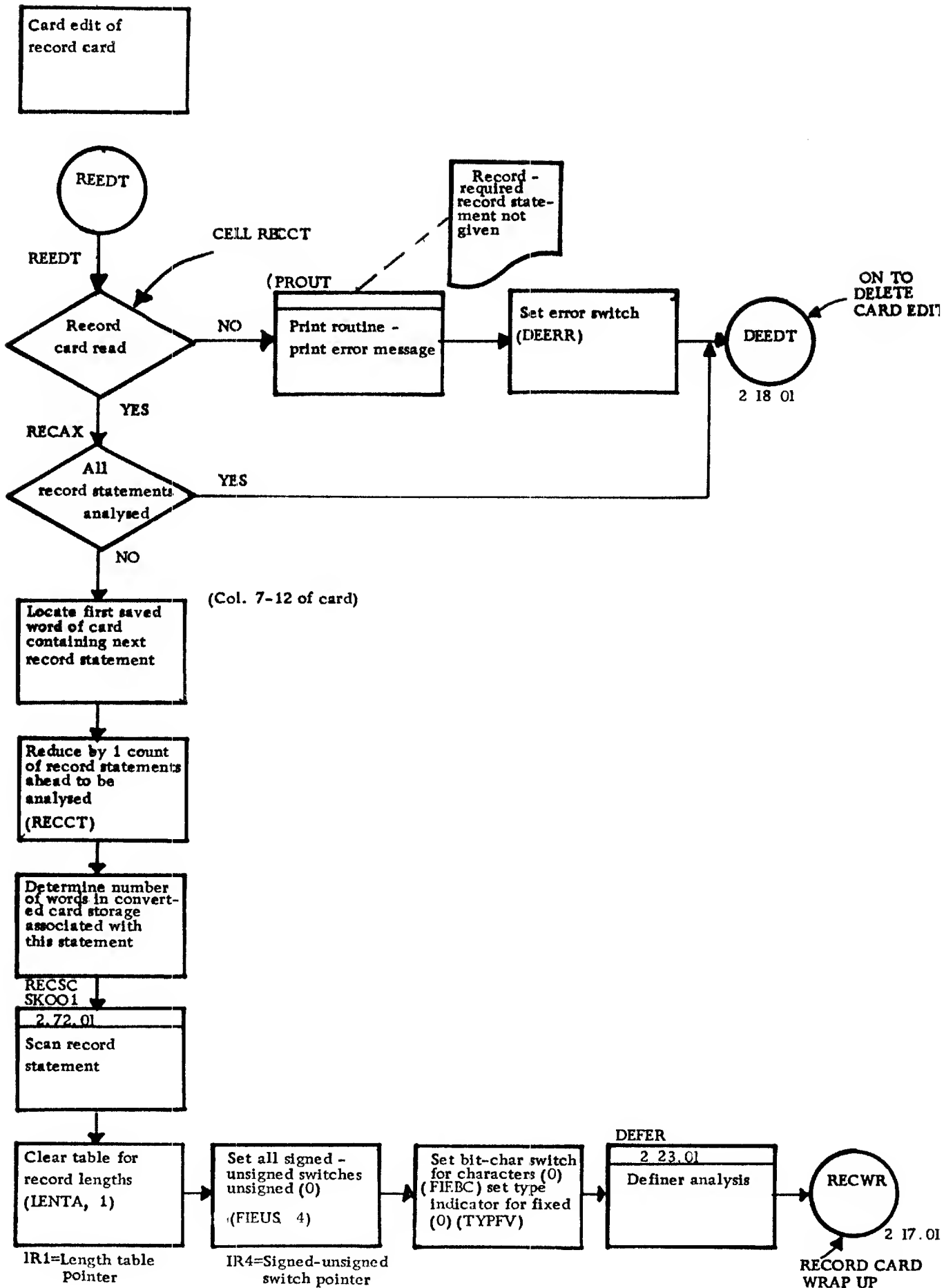


## INPUT AND OUTPUT FILE DATA BLOCK LAYOUT

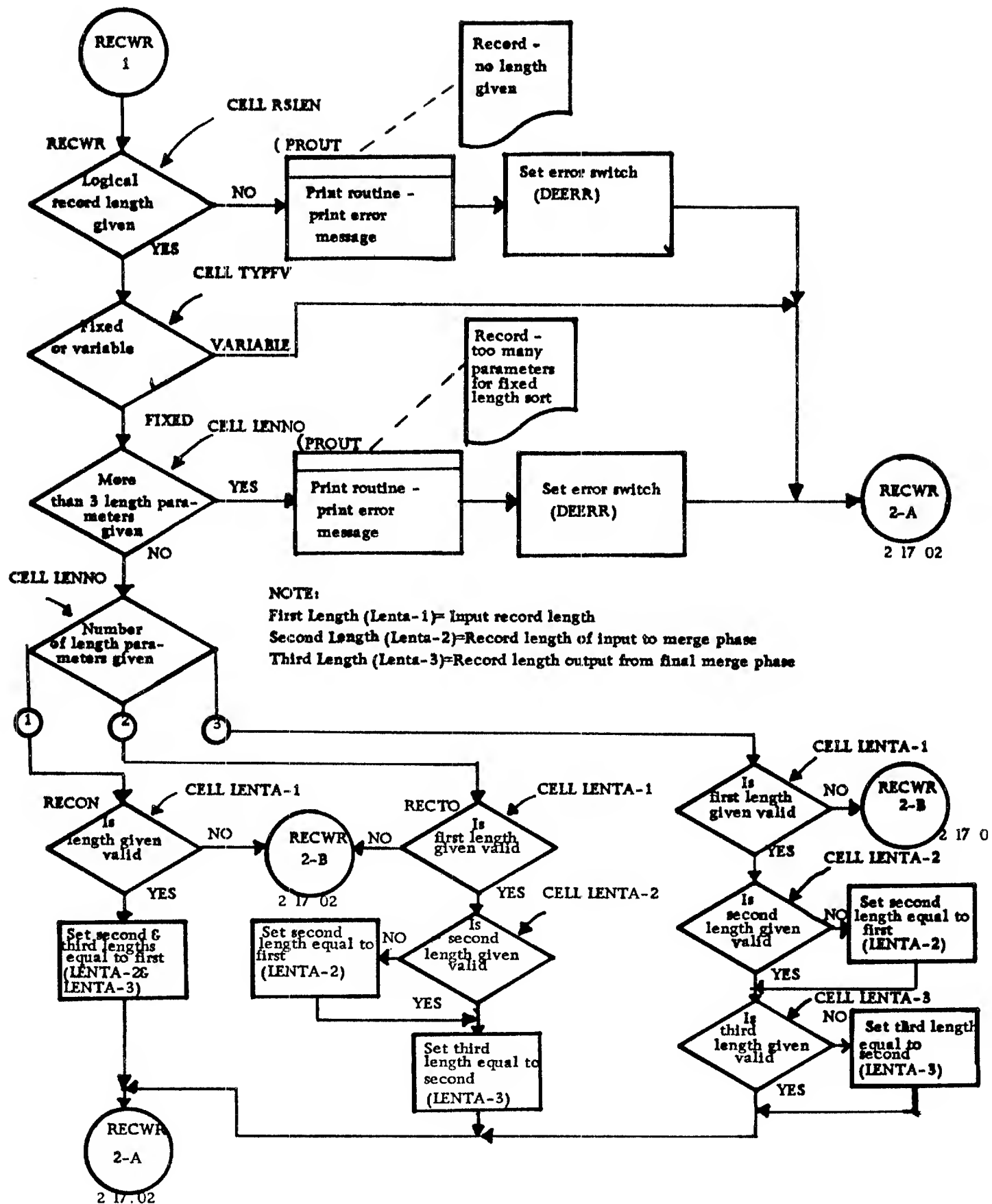
SYMBOLIC LOCATION	DEFINER	ASSOCIATED ROUTINE	DESCRIPTION	USED	
				Input	Output
FAREA + 0	Mode	MODFI	Mode Decimal = Zero Binary = Non-Zero	x	x
FAREA + 1	Density	DENFI	Density High = Zero Low = Non-Zero	x	x
FAREA + 2	Padding	PADFI	Padding No Padding = 0 Low Padding = 1 High Padding = 2	x	x
FAREA + 3	Label	LABFI & FILWR	Label Standard = 0 Non-Standard = 1 No Label = 2	x	x
FAREA + 4	Label	LABFI	Label Density High = Zero Low = Non-Zero	x	x
FAREA + 5	Blocking	BLOFI	Blocksize	x	x
FAREA + 6	Serial	SERFI	Serial Number	x	x
FAREA + 7	RLSEQ	RLSFI	Reel Sequence Number	x	x
FAREA + 8	CKSMS	CKSFI	Checksums No = Zero Yes = Non-Zero	x	x
FAREA + 9	BLKSEQ	BLKFI	Block Sequence No = Zero Yes = Non-Zero	x	x
FAREA + 10	DICT	DICFI	Dictionary No = Zero Yes = Non-Zero	x	x
FAREA + 11	Name	NAMFI	Name - Word 1	x	x
FAREA + 12	Name	NAMFI	Name - Word 2	x	x
FAREA + 13	Name	NAMFI	Name - Word 3	x	x
FAREA + 14	Input	INPFI	Input Number	x	
FAREA + 15	Reels	REEFI	Number of Reels	x	x
FAREA + 16	Record	RECFI	Number of Input Records	x	
FAREA + 17	CKPT	CKPFI	Checkpoint Standard = 0 Non-Standard = 1 No Checkpoint = 2	x	
FAREA + 18	Retain	RETFI	Retain		x
FAREA + 19	CKSMS/BLKSEQ	CKSFI/BLKFI	Checksums or Block Sequence Neither = Zero Yes = Non-Zero	x	x
FAREA + 20	---	CALCU	Grouping Factor		
FAREA + 21			Number of reels processed to date		
FAREA + 22	--	SAMWRP	Blocksize plus CKSUM or Sequence word		
FAREA + 23	---	SAMWRP	Blocking - Blocksize/record length		
FAREA + 24					



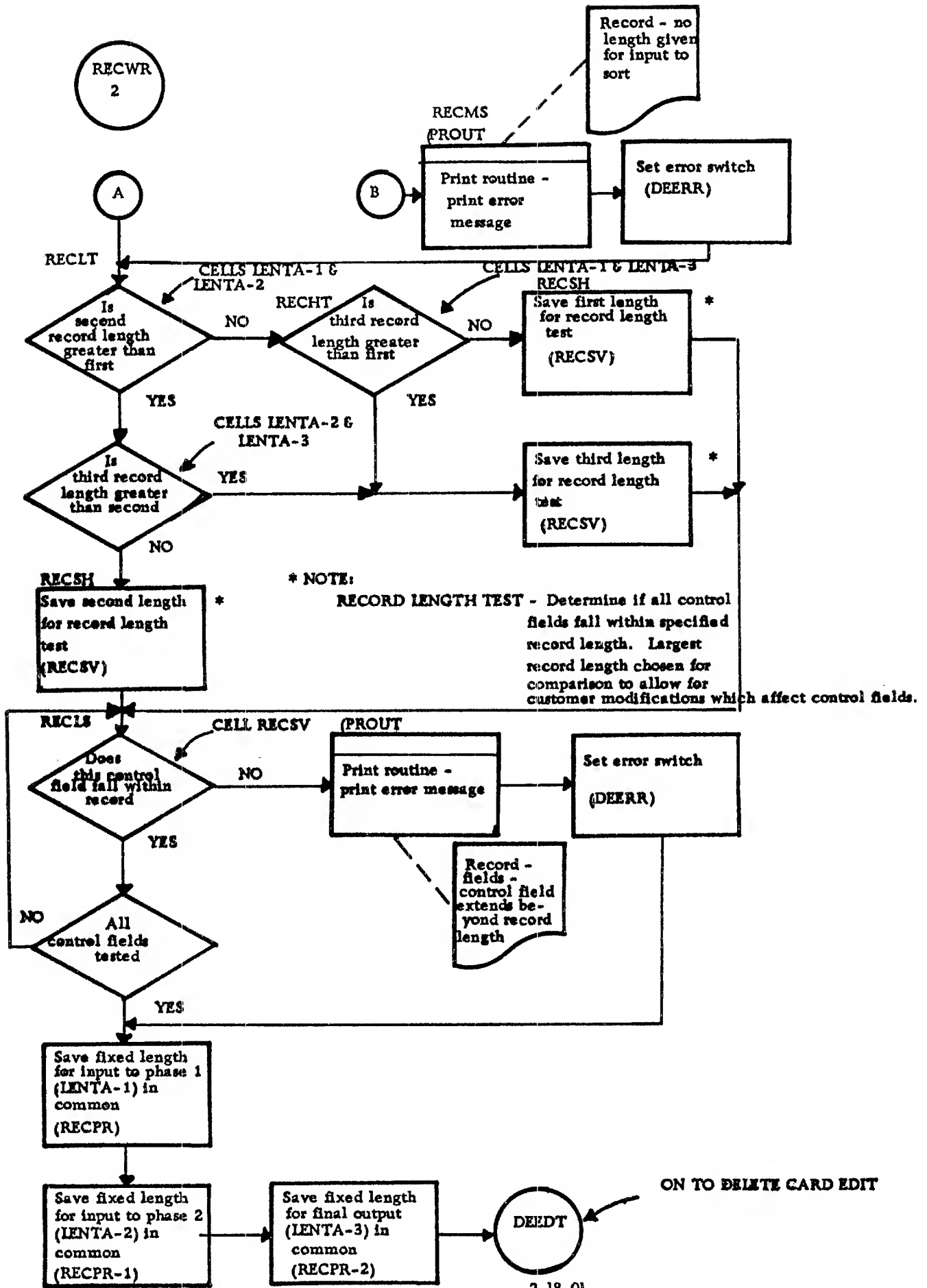


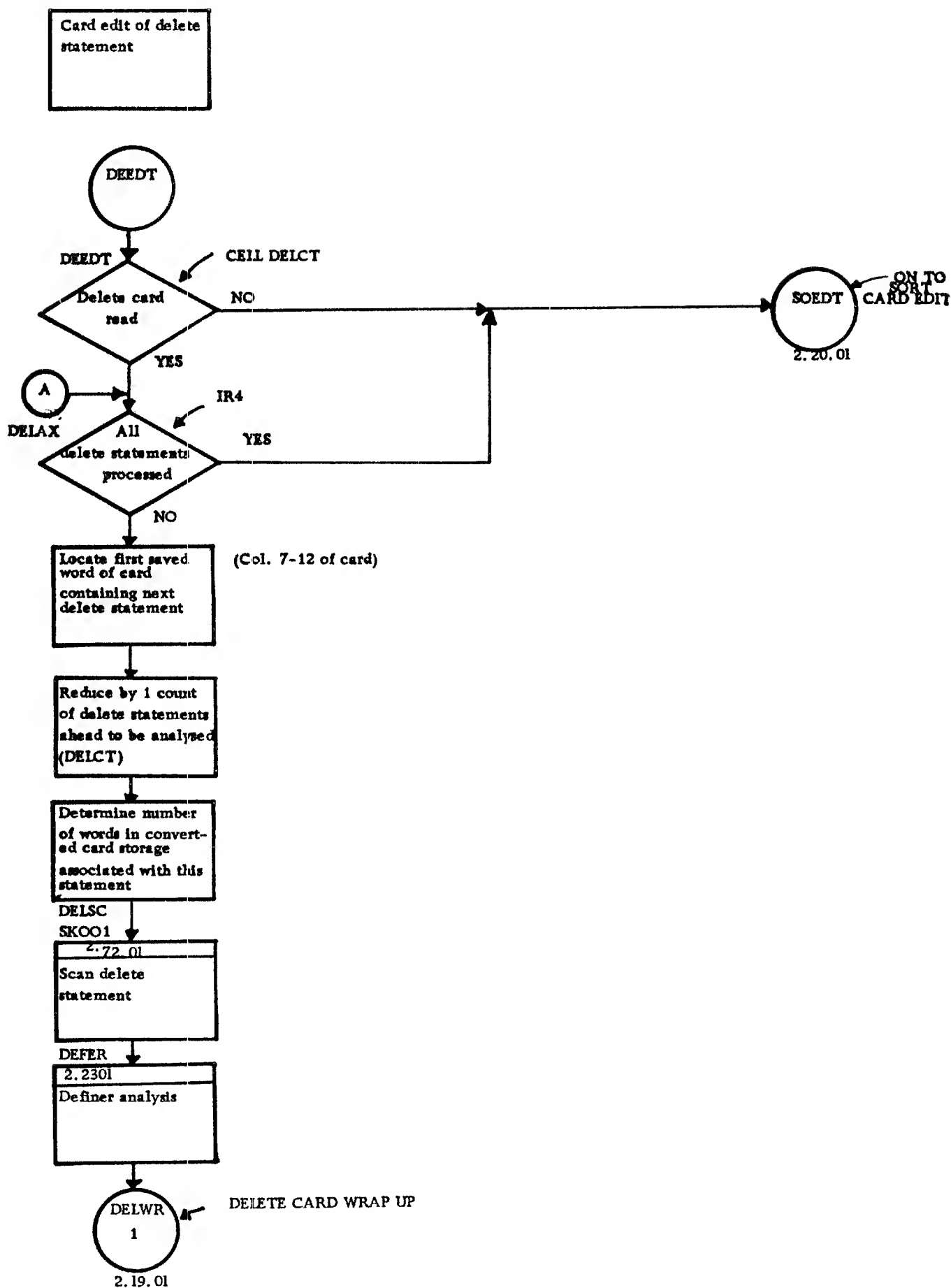


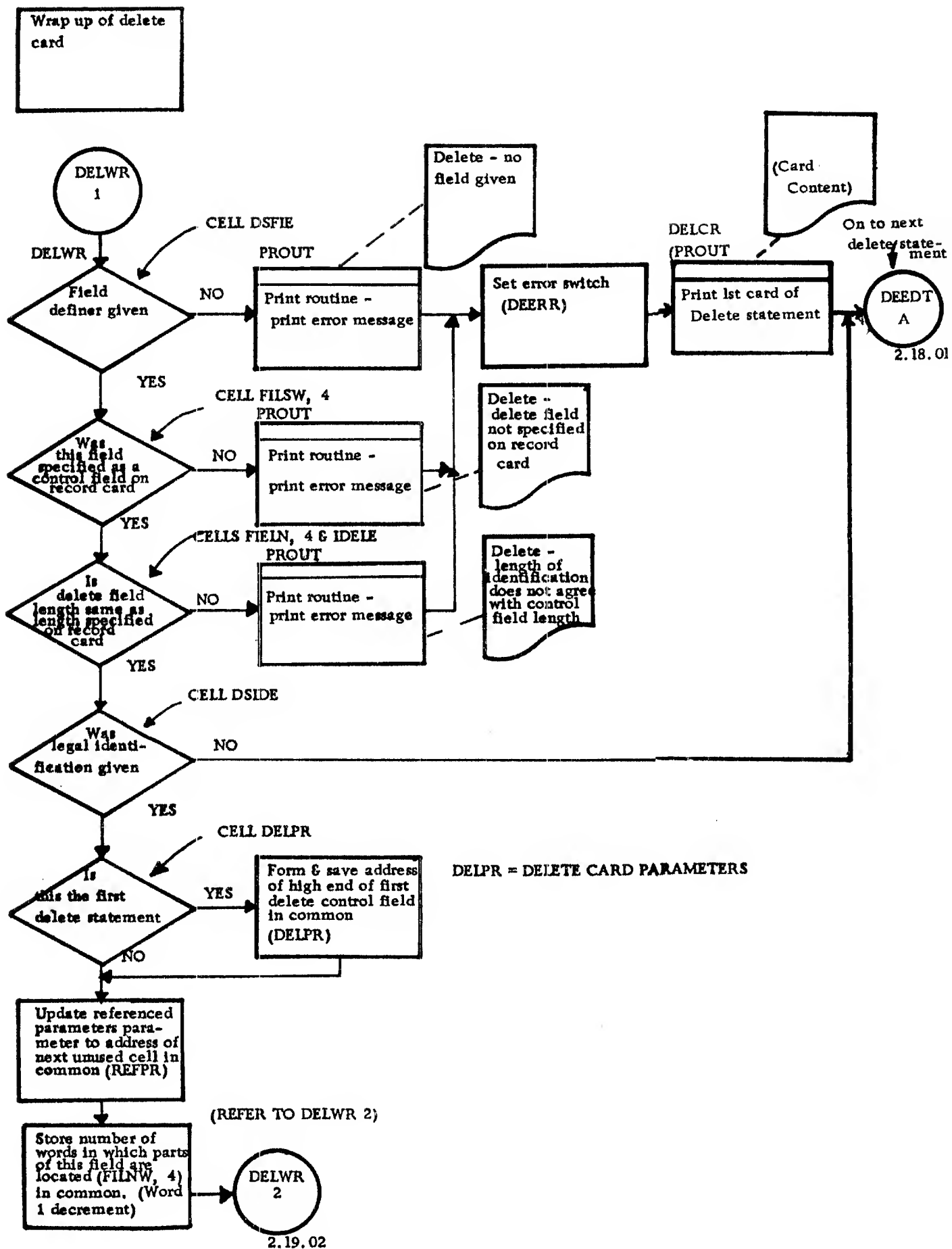
Record card  
wrap up

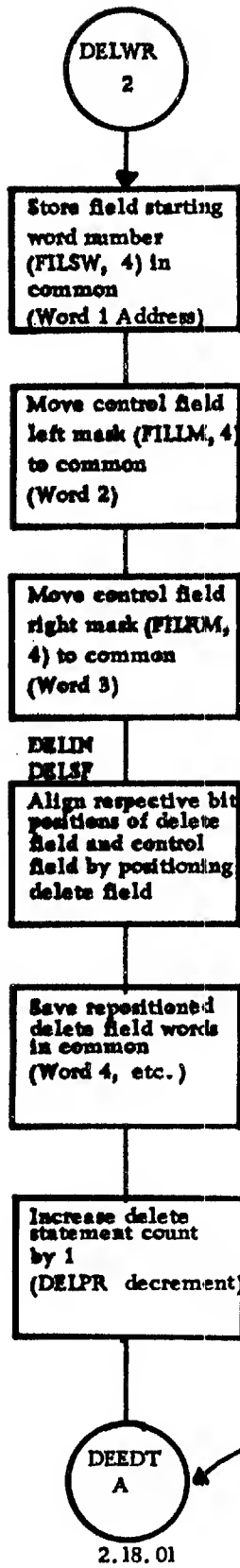








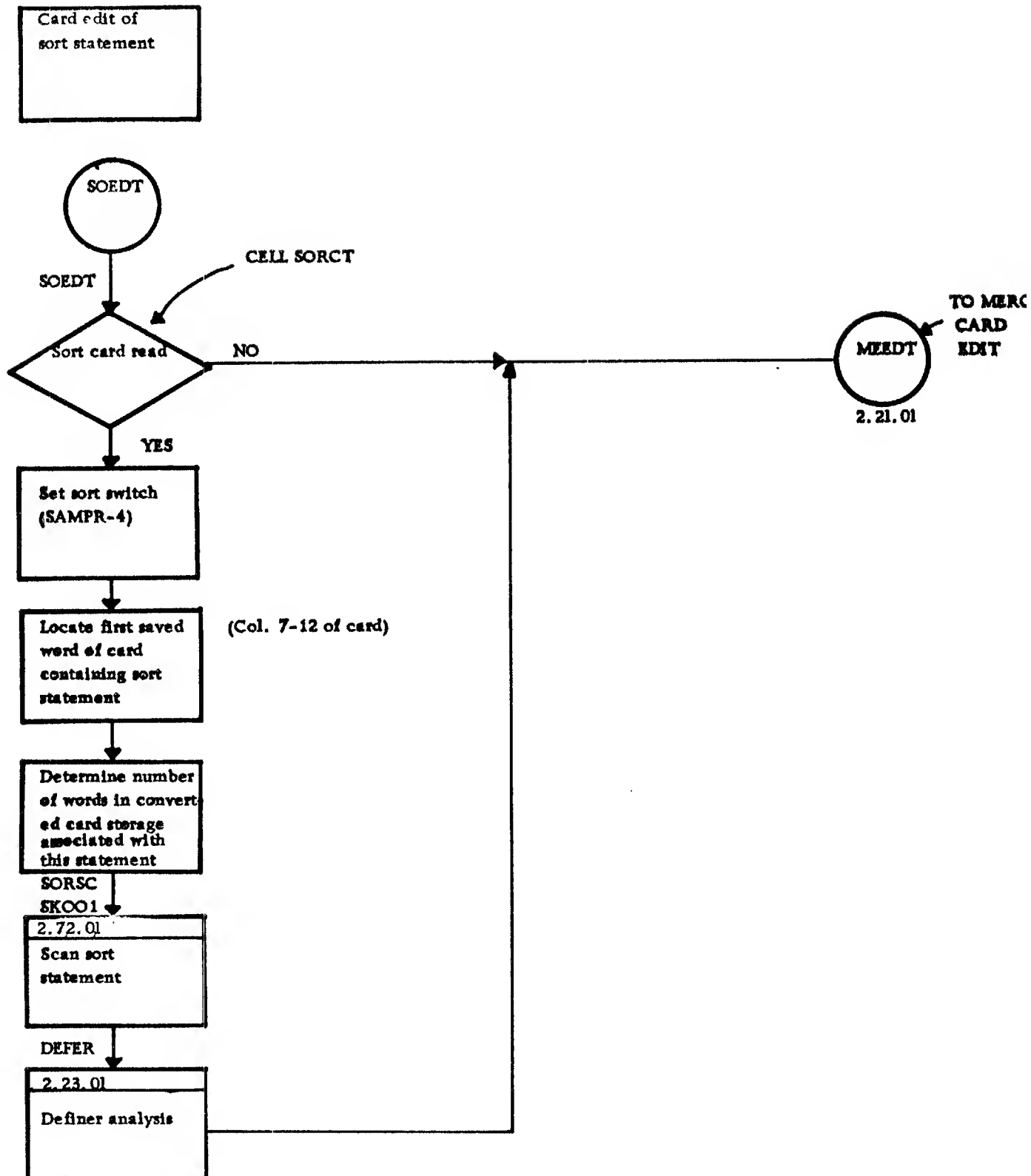


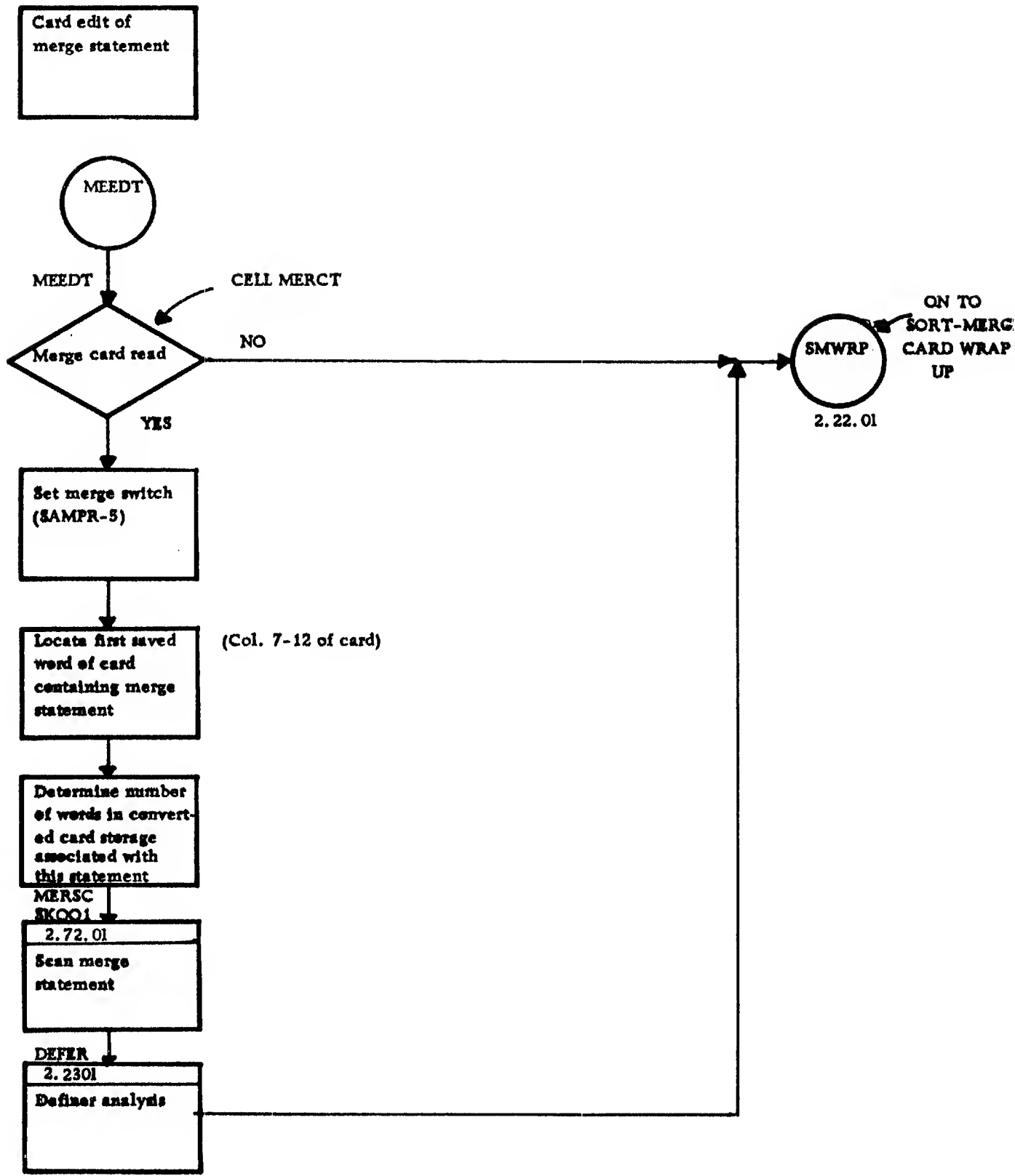


ON TO NEXT DELETE STATEMENT

DELETE CONTROL FIELD DESCRIPTION AREA LAYOUT

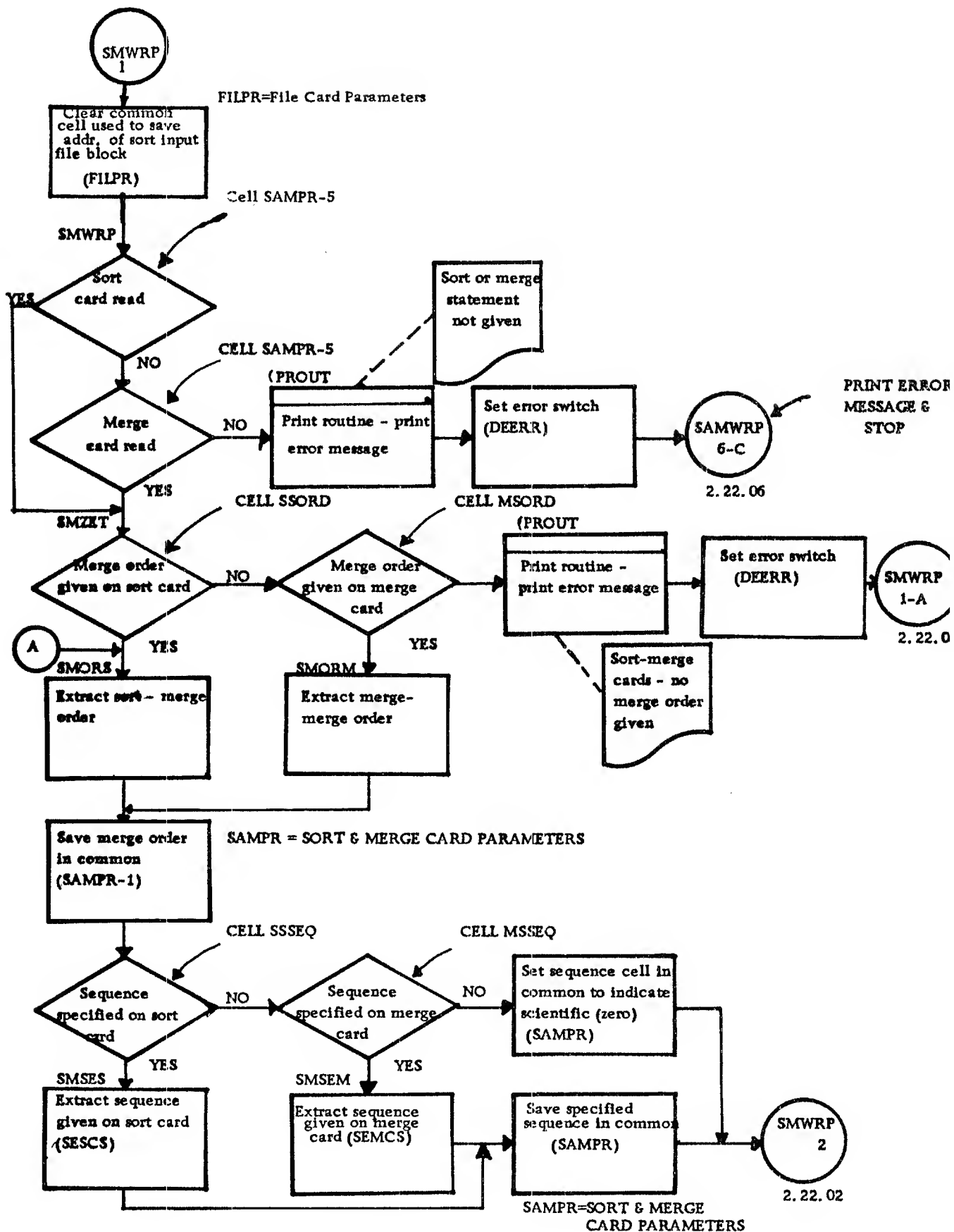
WORD	PORTION	DESCRIPTION
1	Address	Starting word
	Decrement	Number of words field extends over
2	Entire	Left Mask
3	Entire	Right Mask
4	Entire	First word of field
.....		
N	Entire	Last word of field

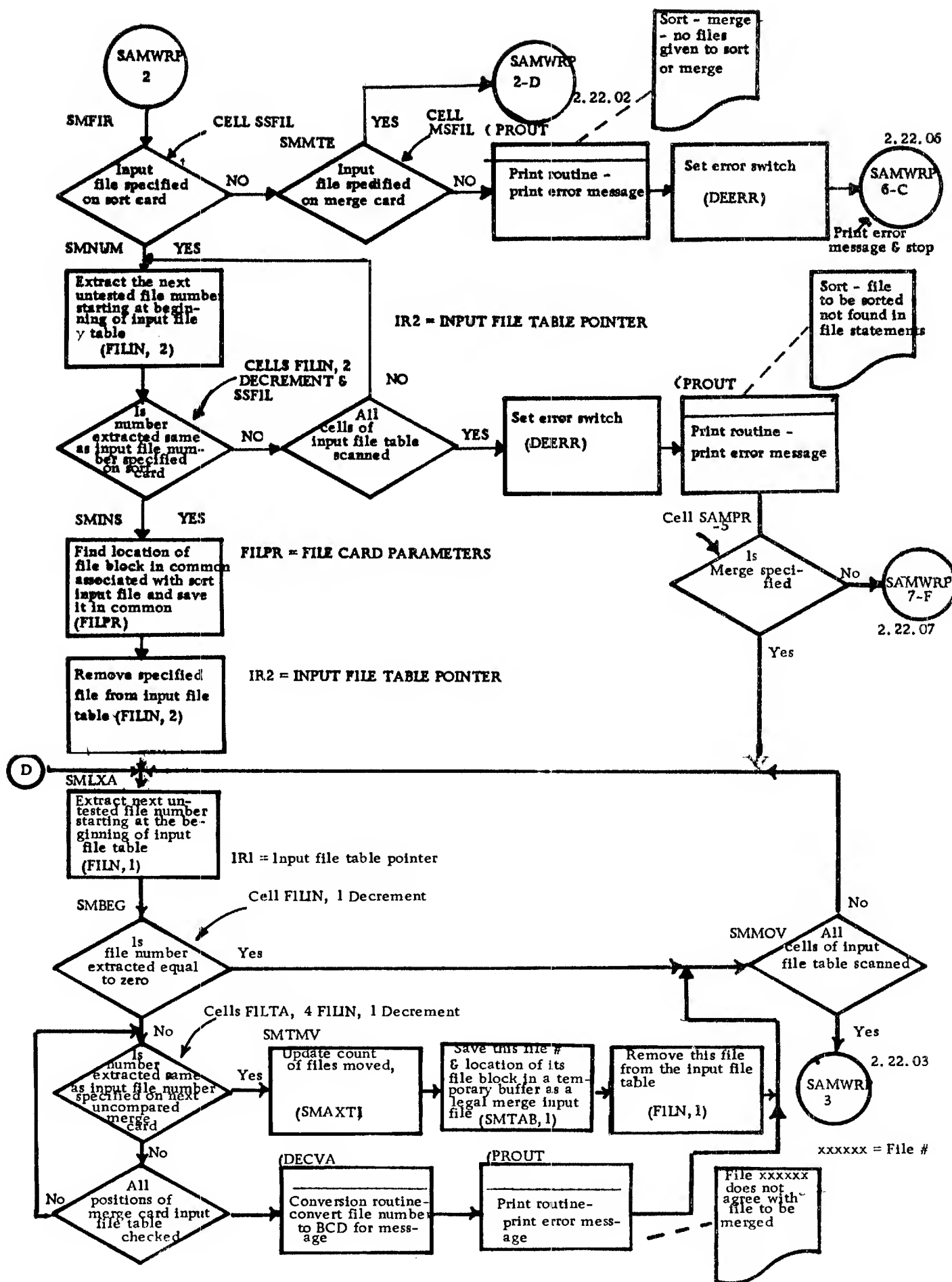




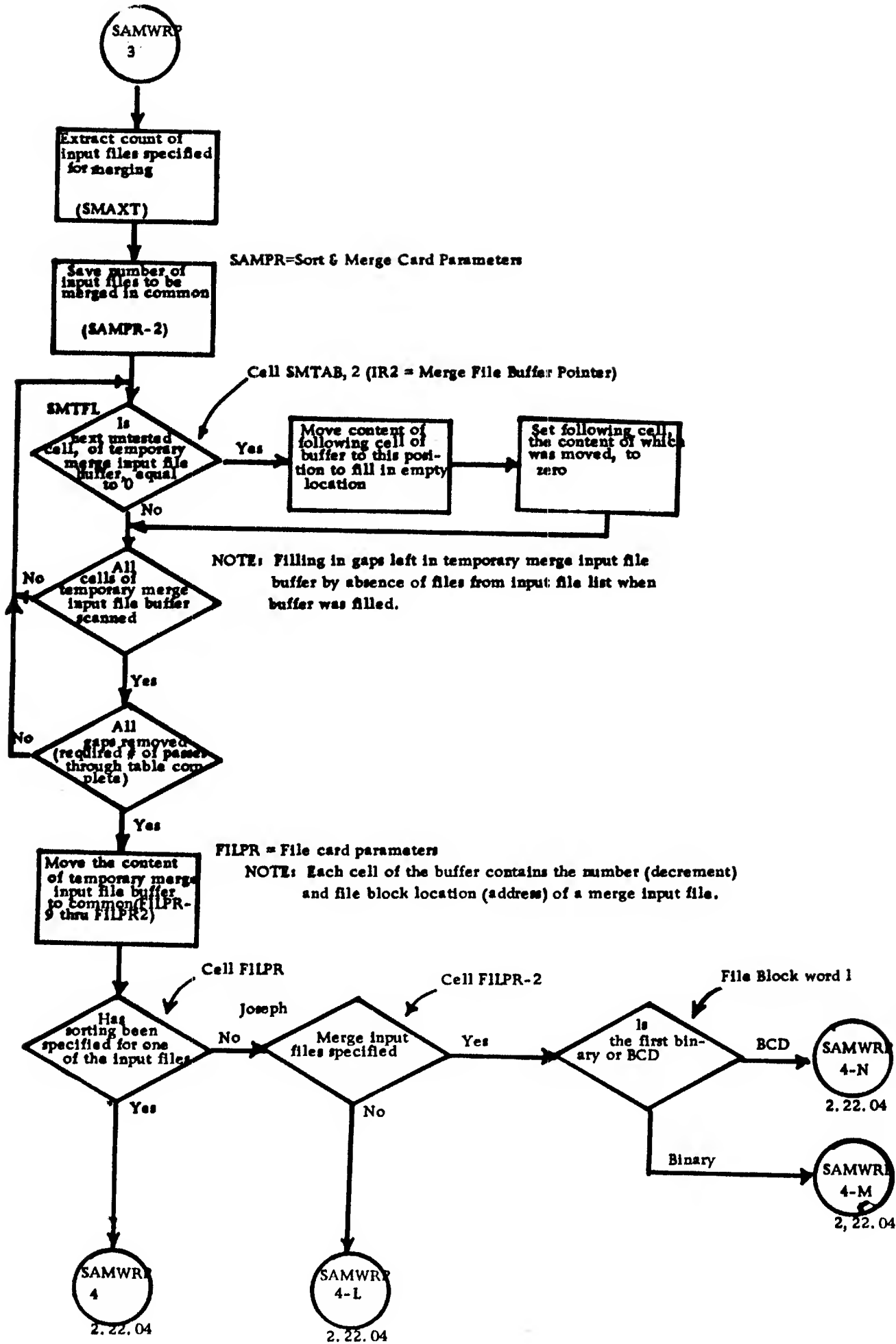
Wrap up of sort -  
merge cards

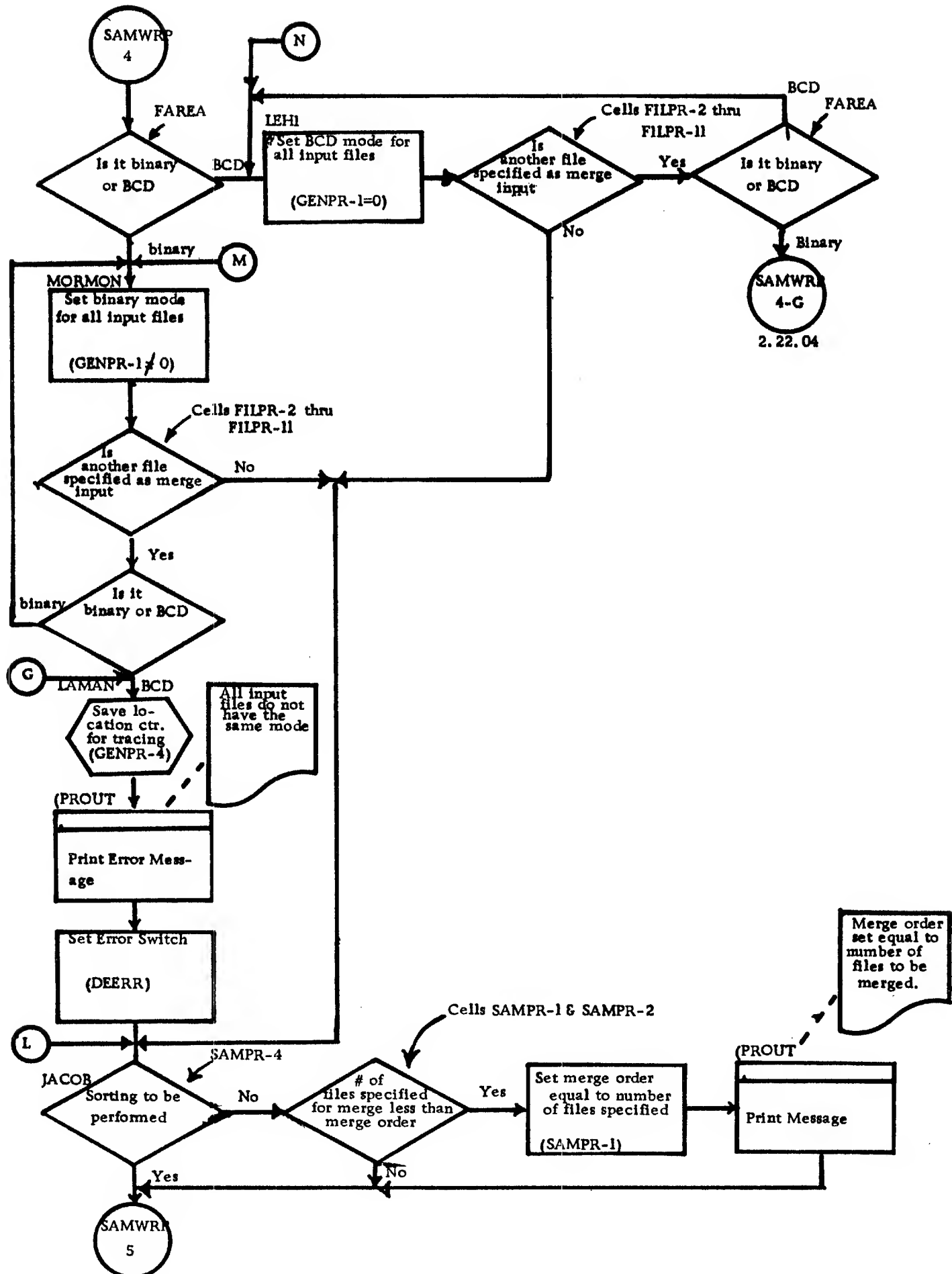
2. 22. 01

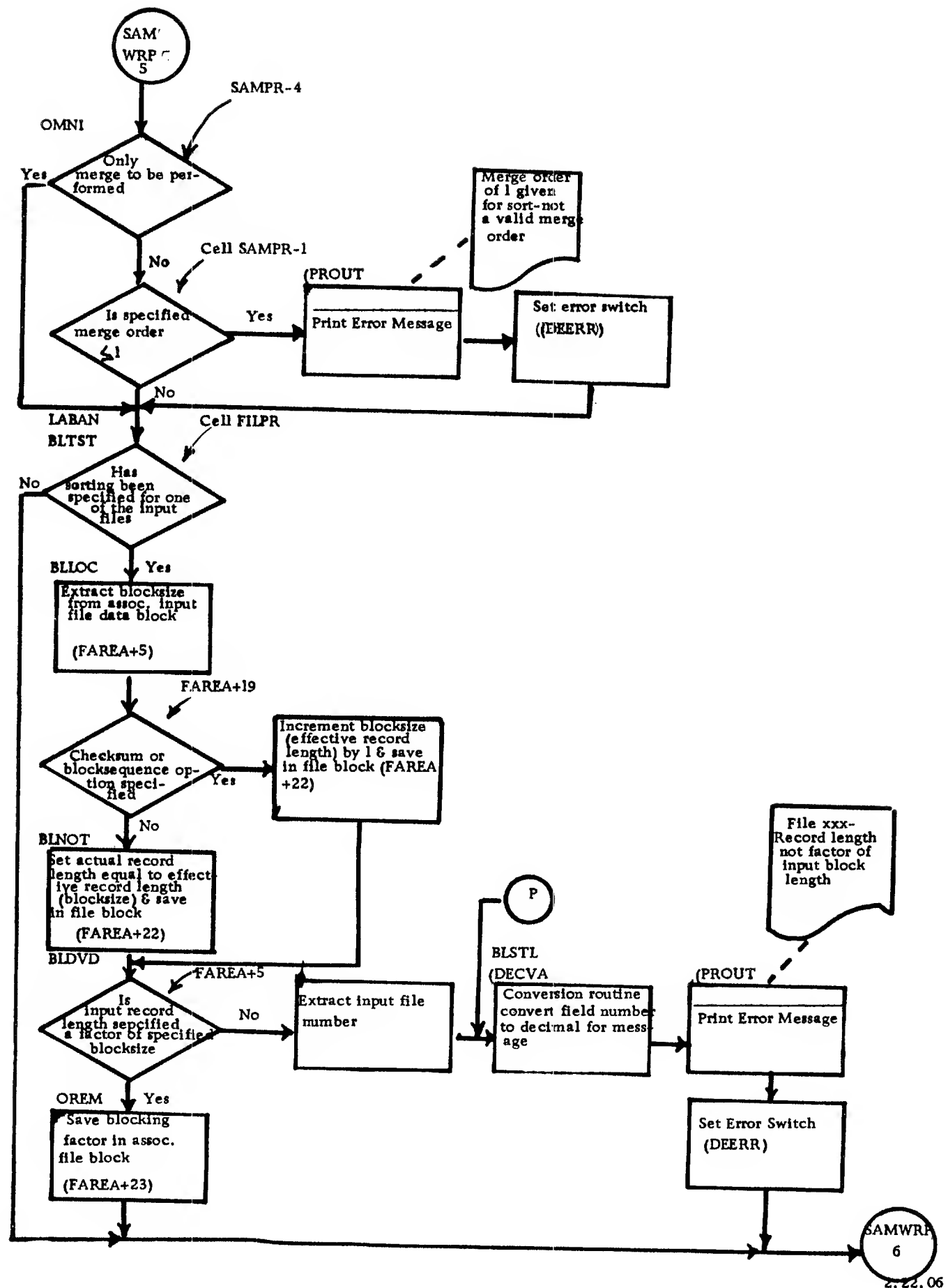


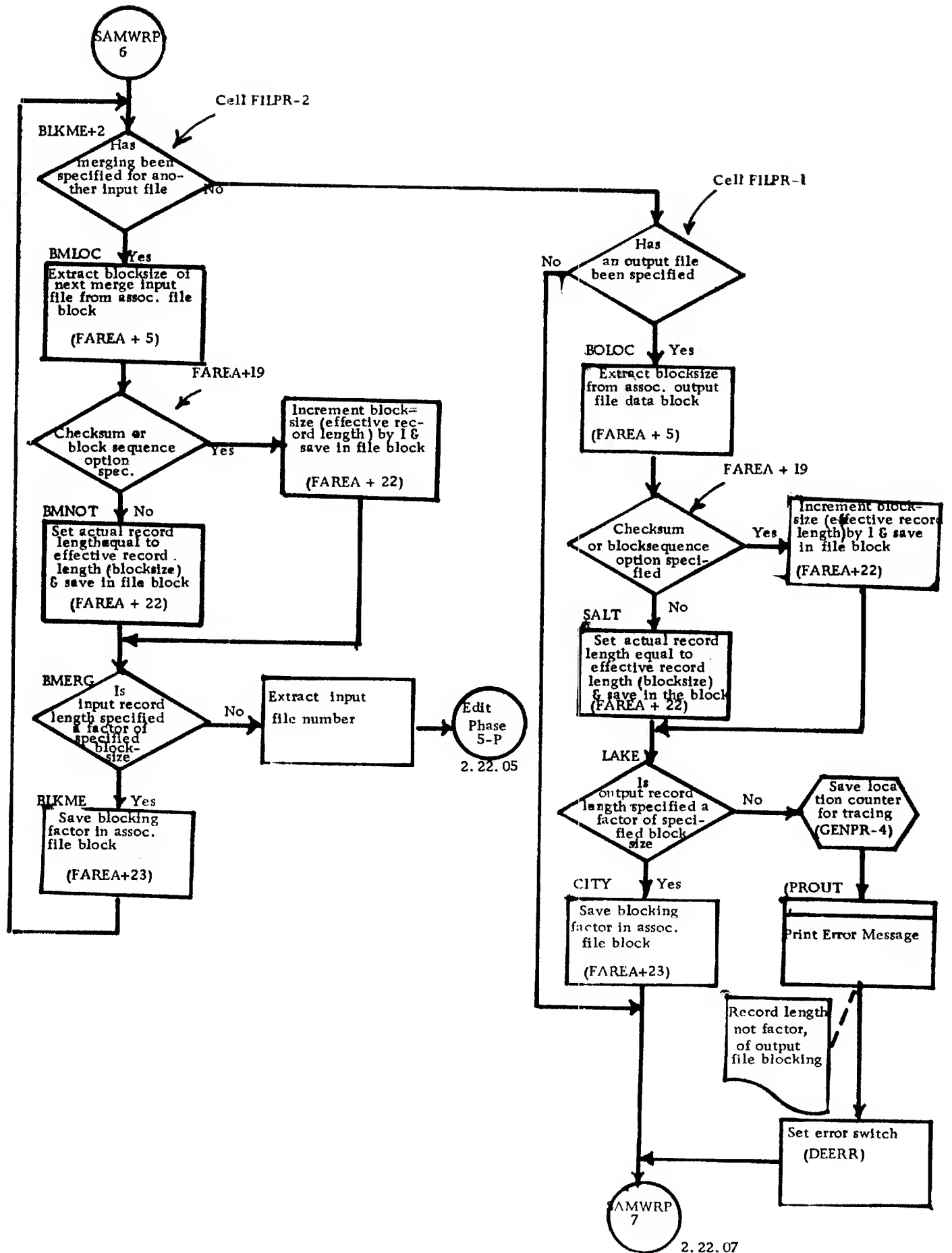


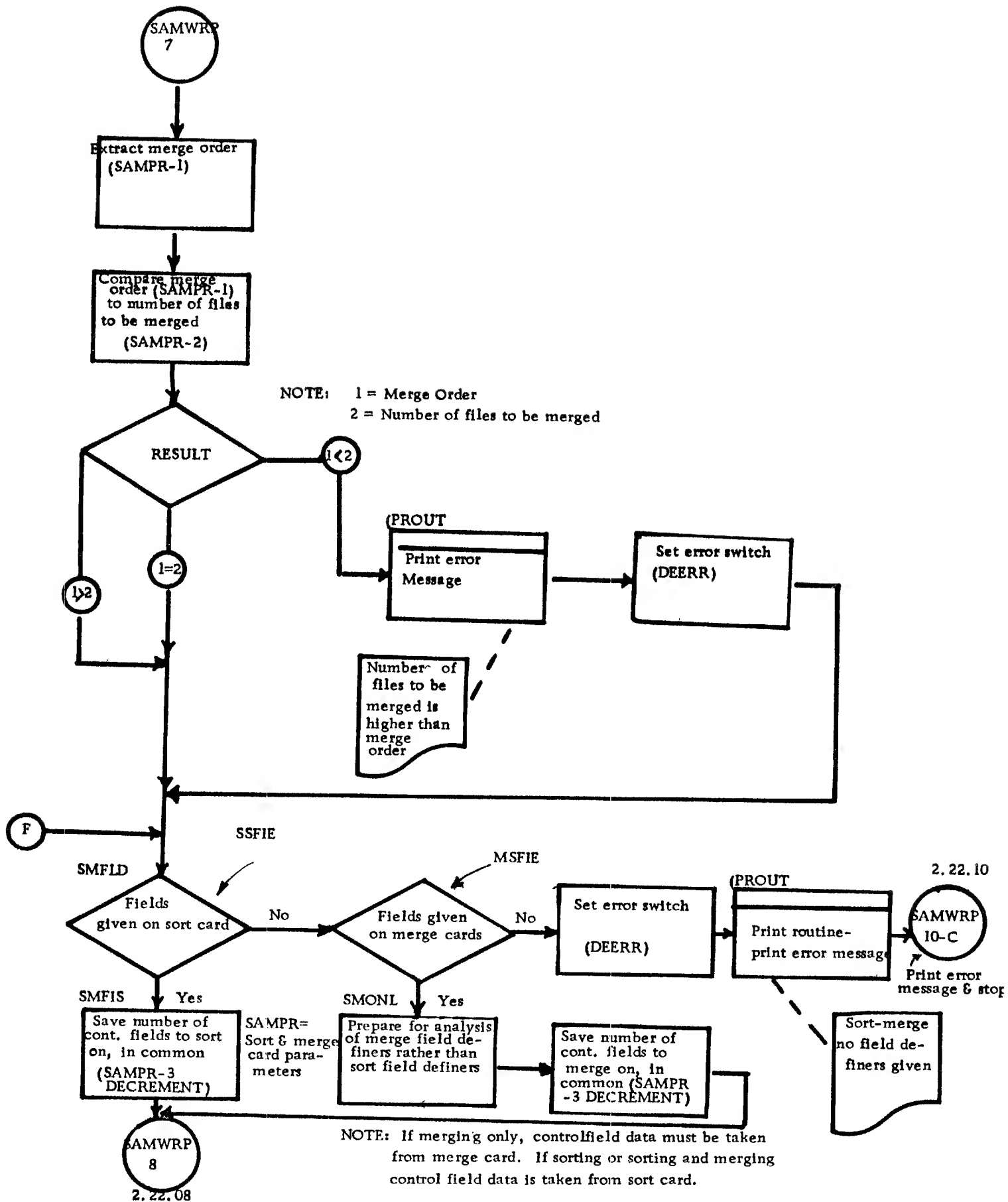


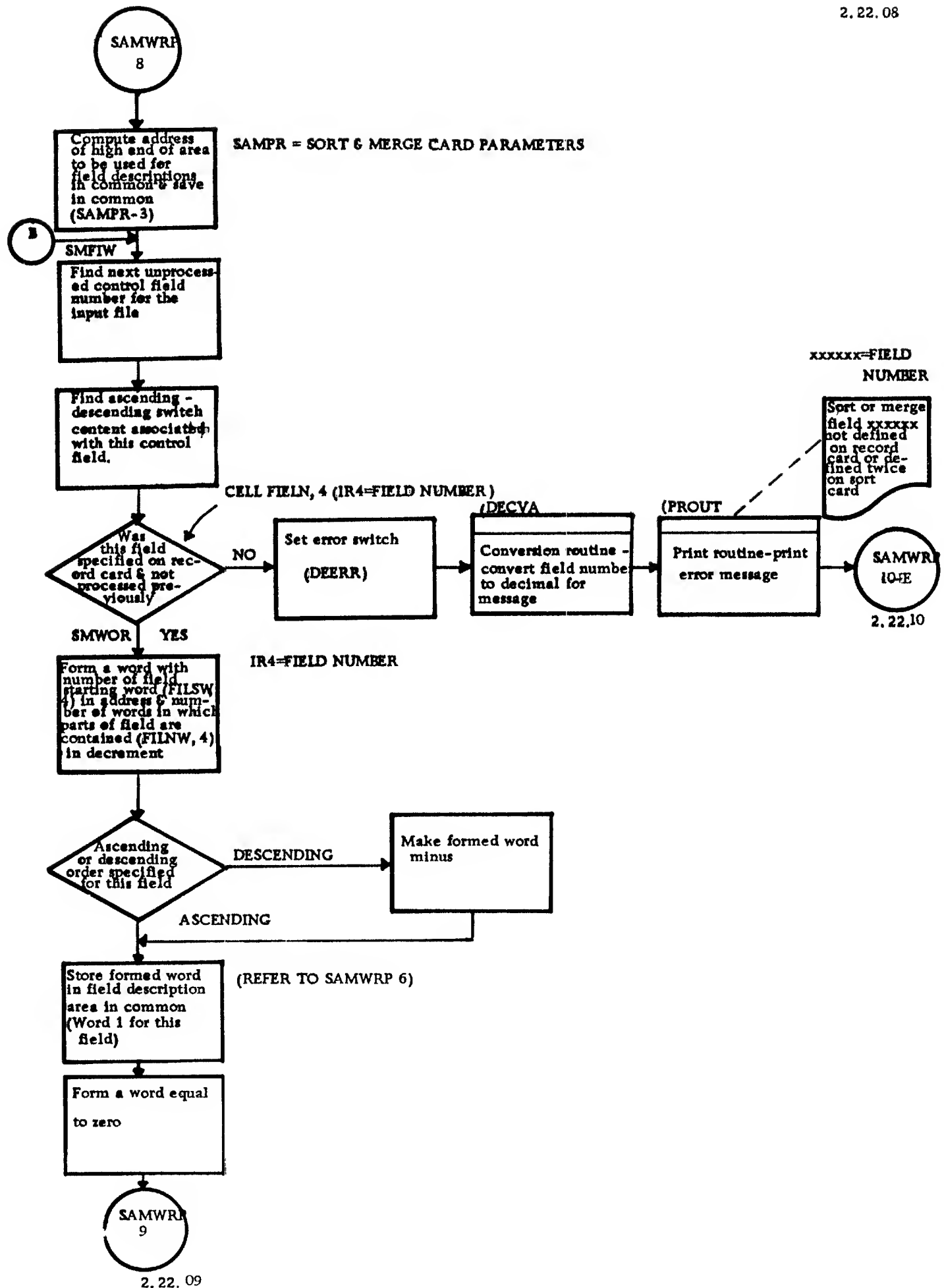


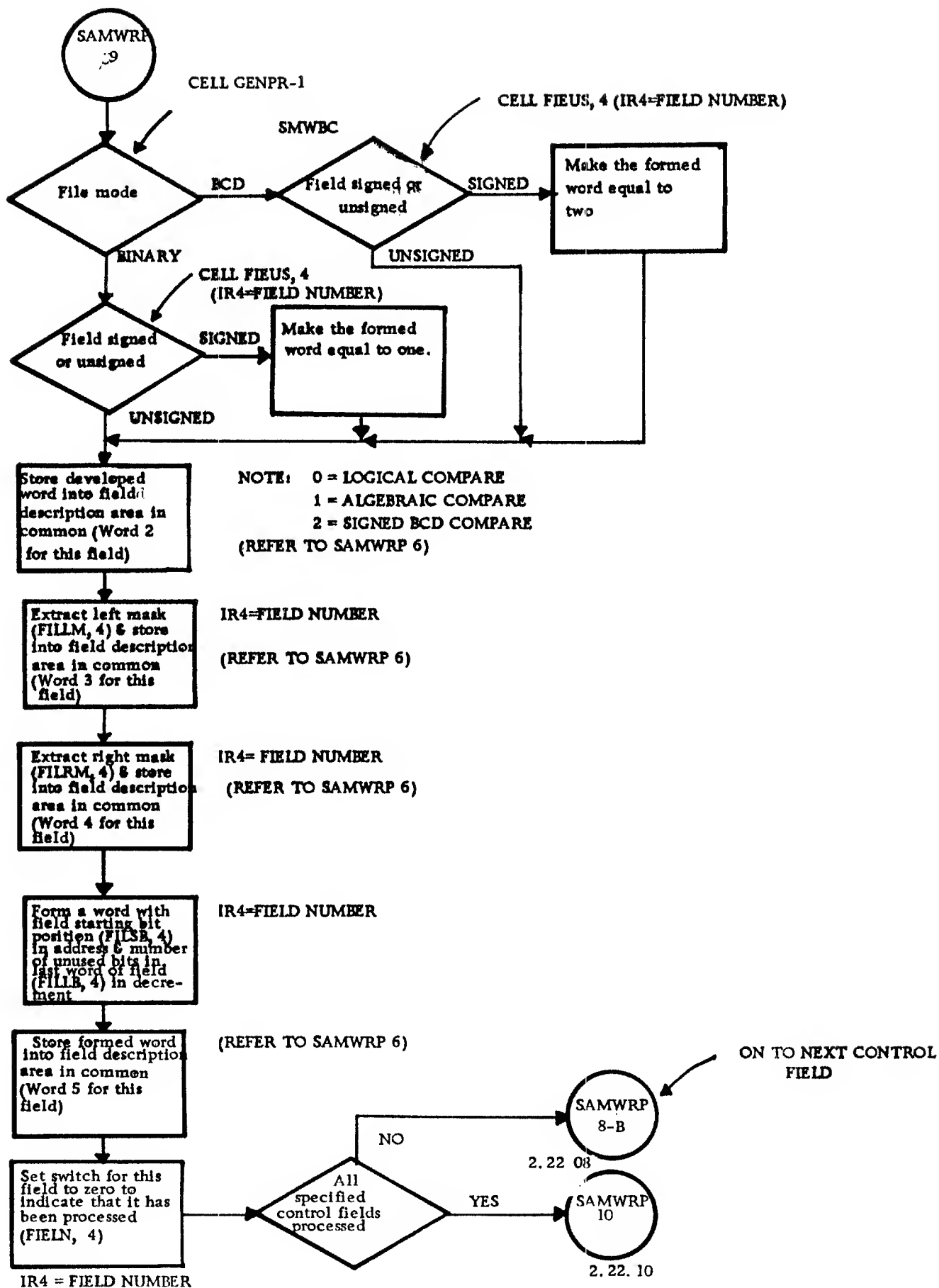


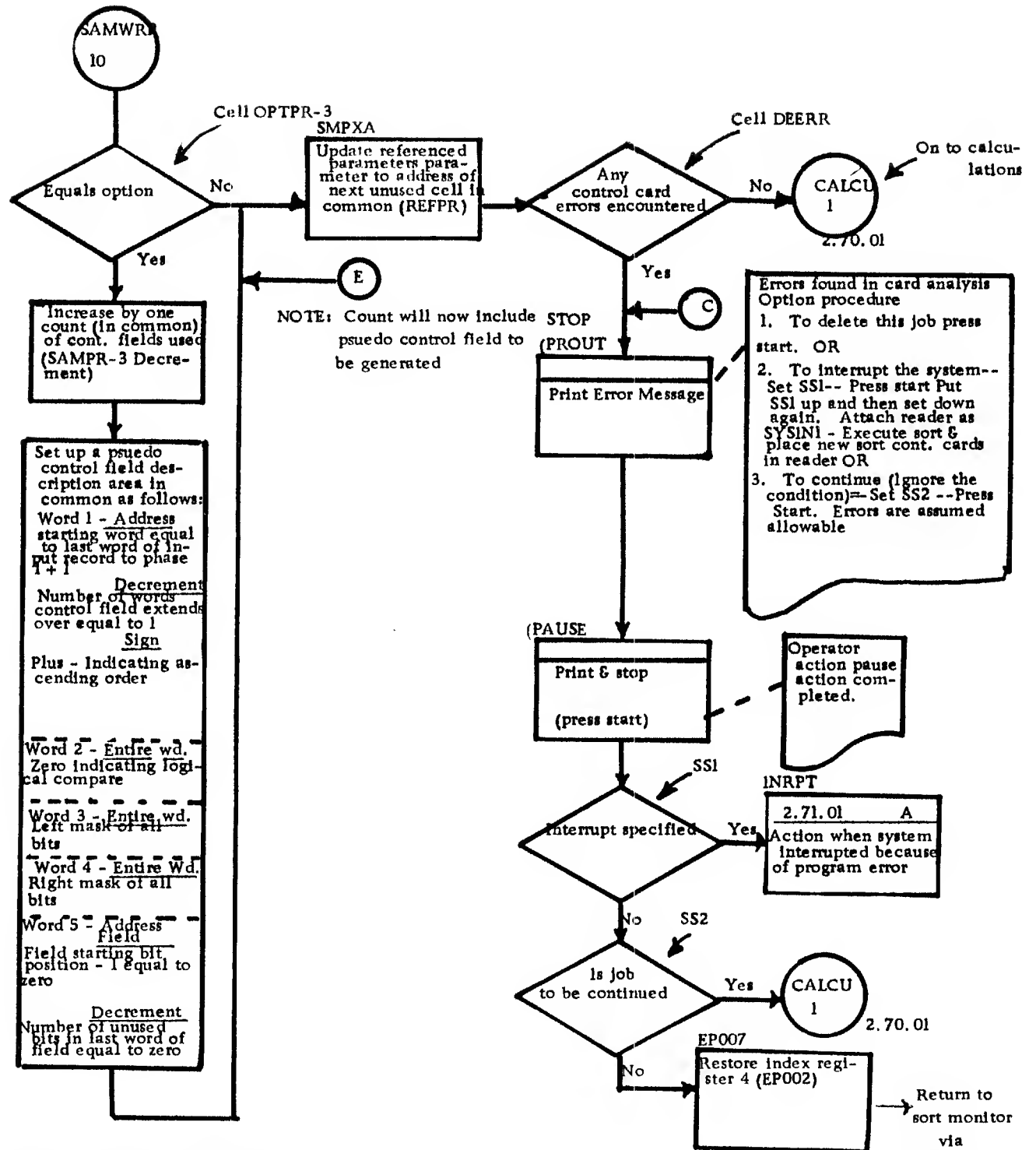








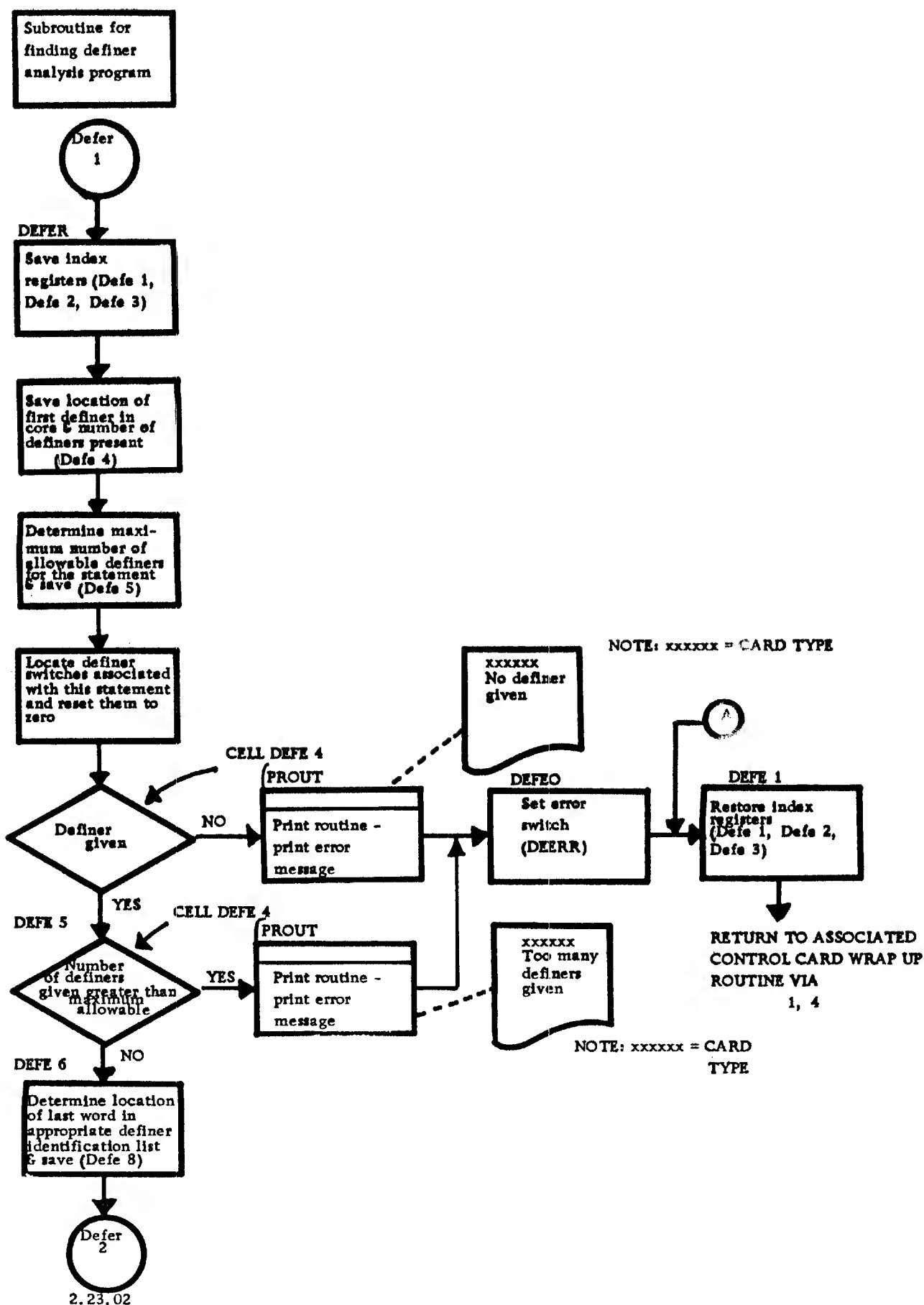


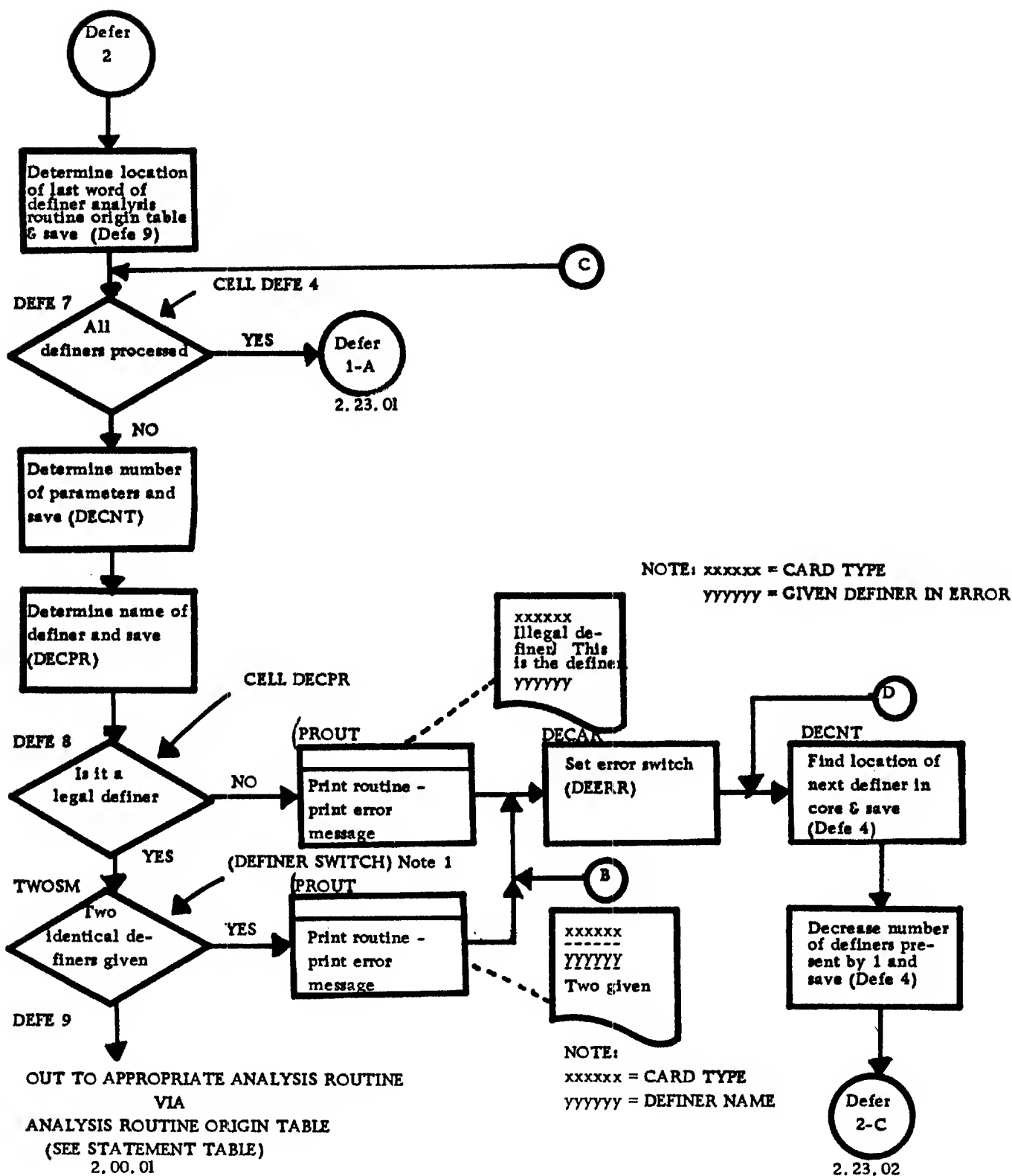


### SORT/MERGE CONTROL FIELD DESCRIPTION AREA LAYOUT

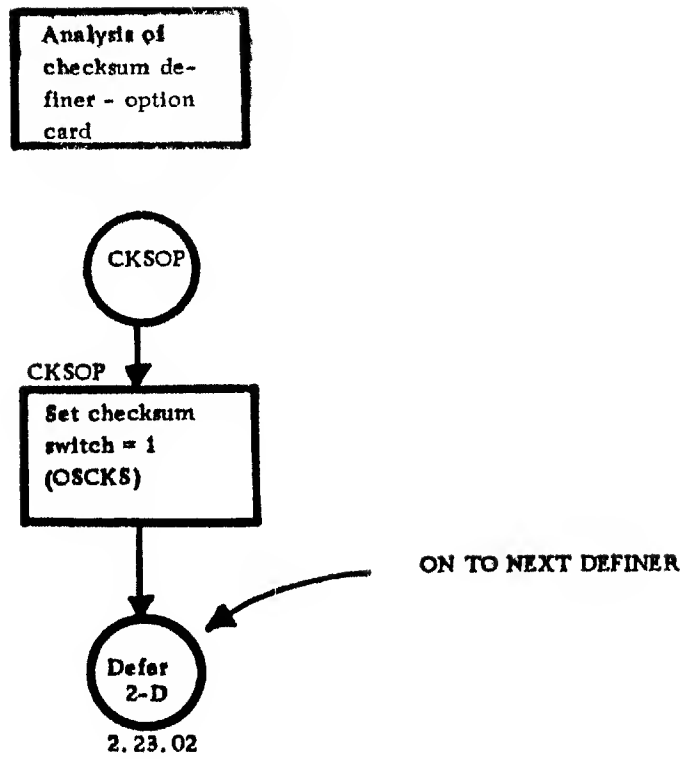
Word	Portion	DESCRIPTION
1	Sign	Ascending = 0 Descending = 1
	Address	Starting Word
	Decrement	Number of words field extends over
2	Address	Logical compare = 0 Algebraic Compare = 1 Signed BCD Compare = 2
3	Entire	Left Mask
4	Entire	Right Mask
5	Address	Field starting bit position
	Decrement	Number of unused bit positions in last word of field



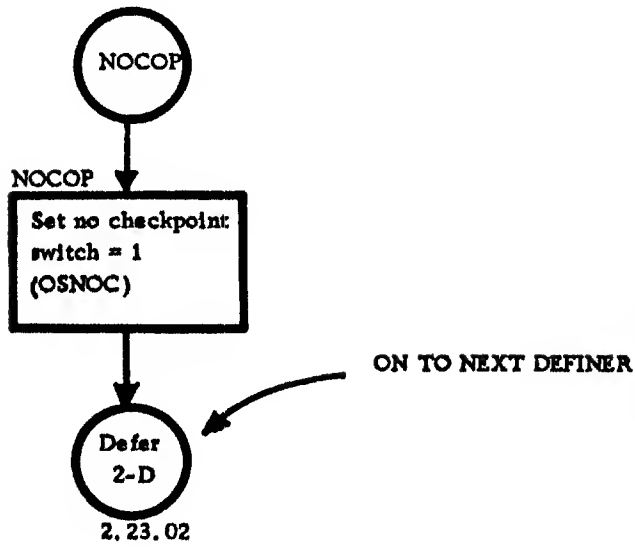




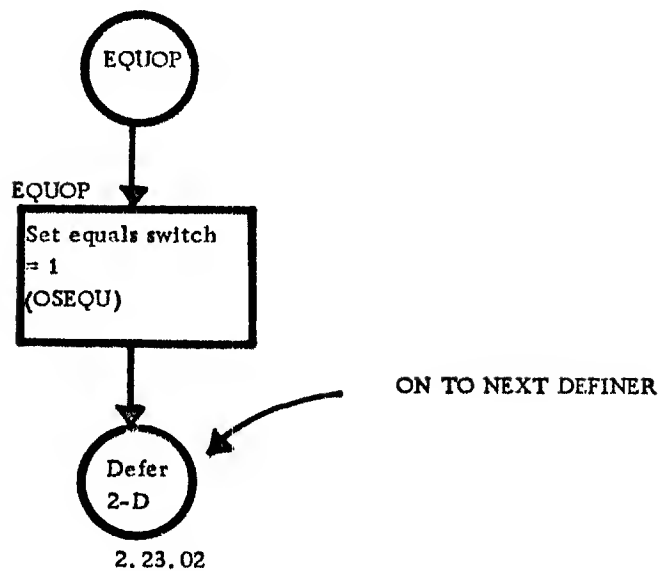
NOTE 1 - DEFINER SWITCH SET ON FIRST PASS THROUGH ASSOCIATED ANALYSIS ROUTINE.



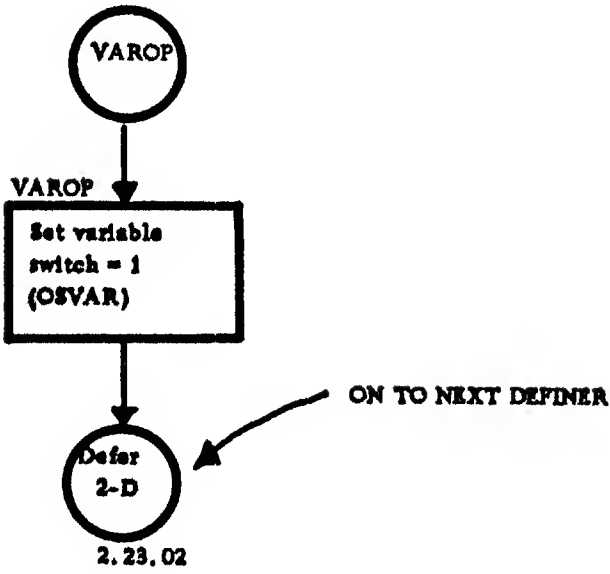
Analysis of no  
checkpoint de-  
finer - option  
card



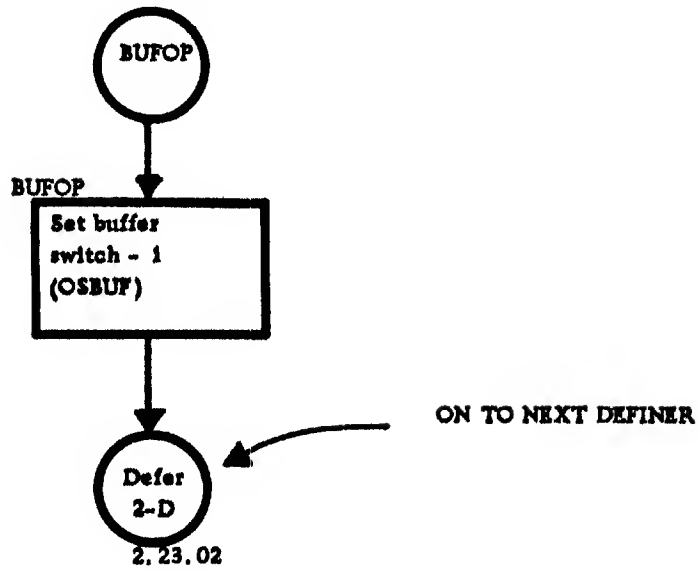
Analysis of equals  
definer - option  
card

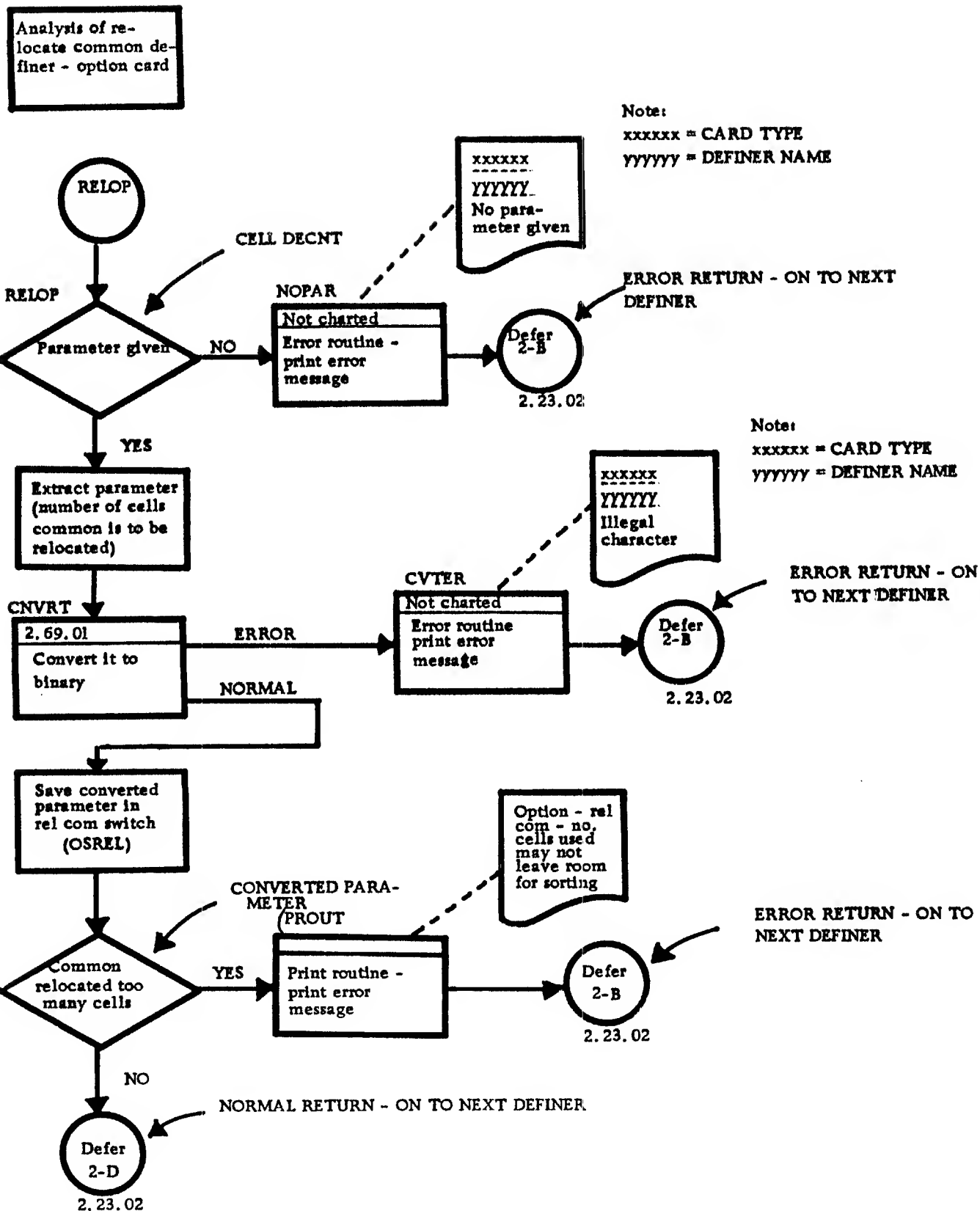


Analysis of  
variable definer -  
option card

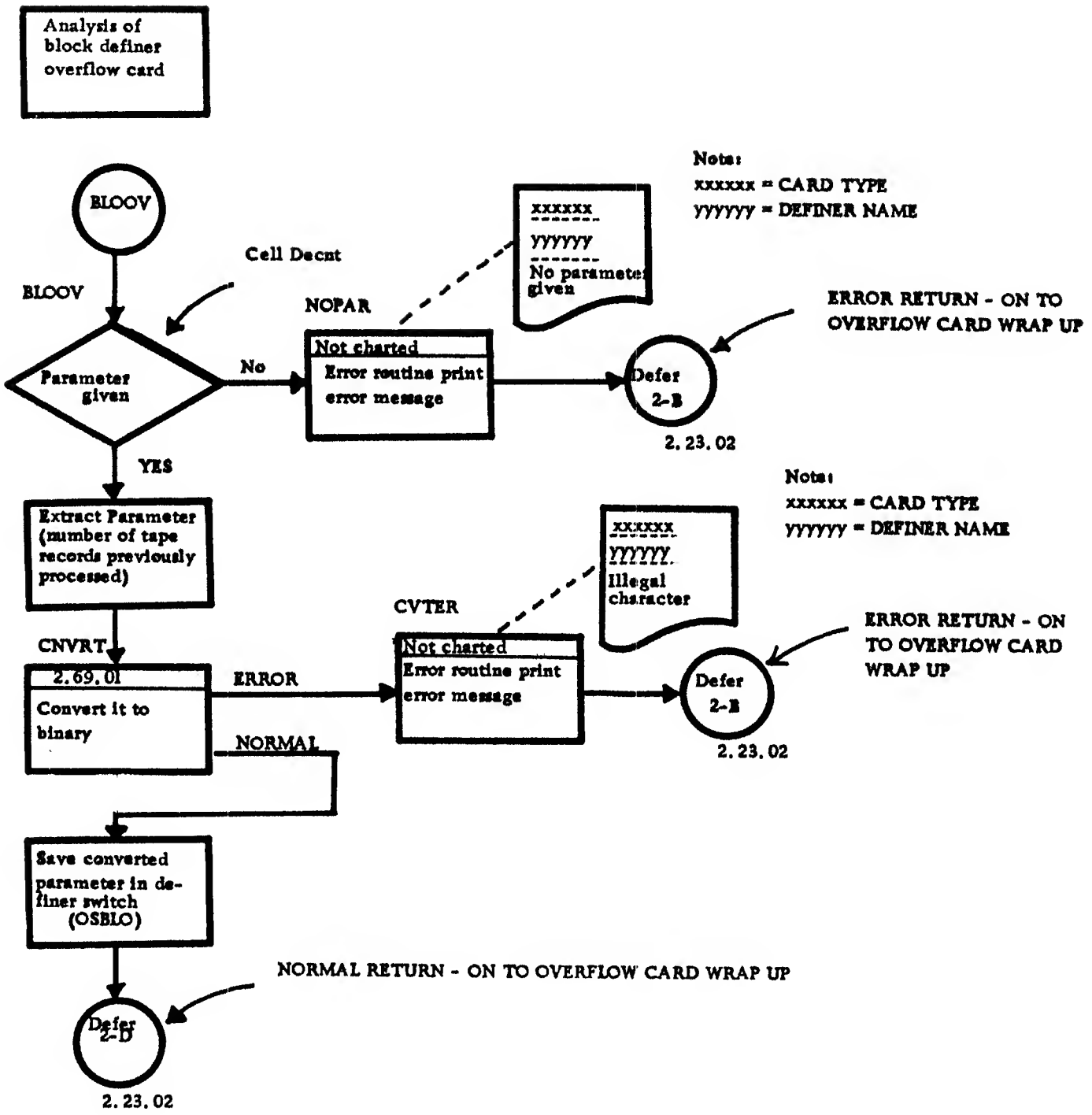


Analysis of  
buffer definer -  
option card

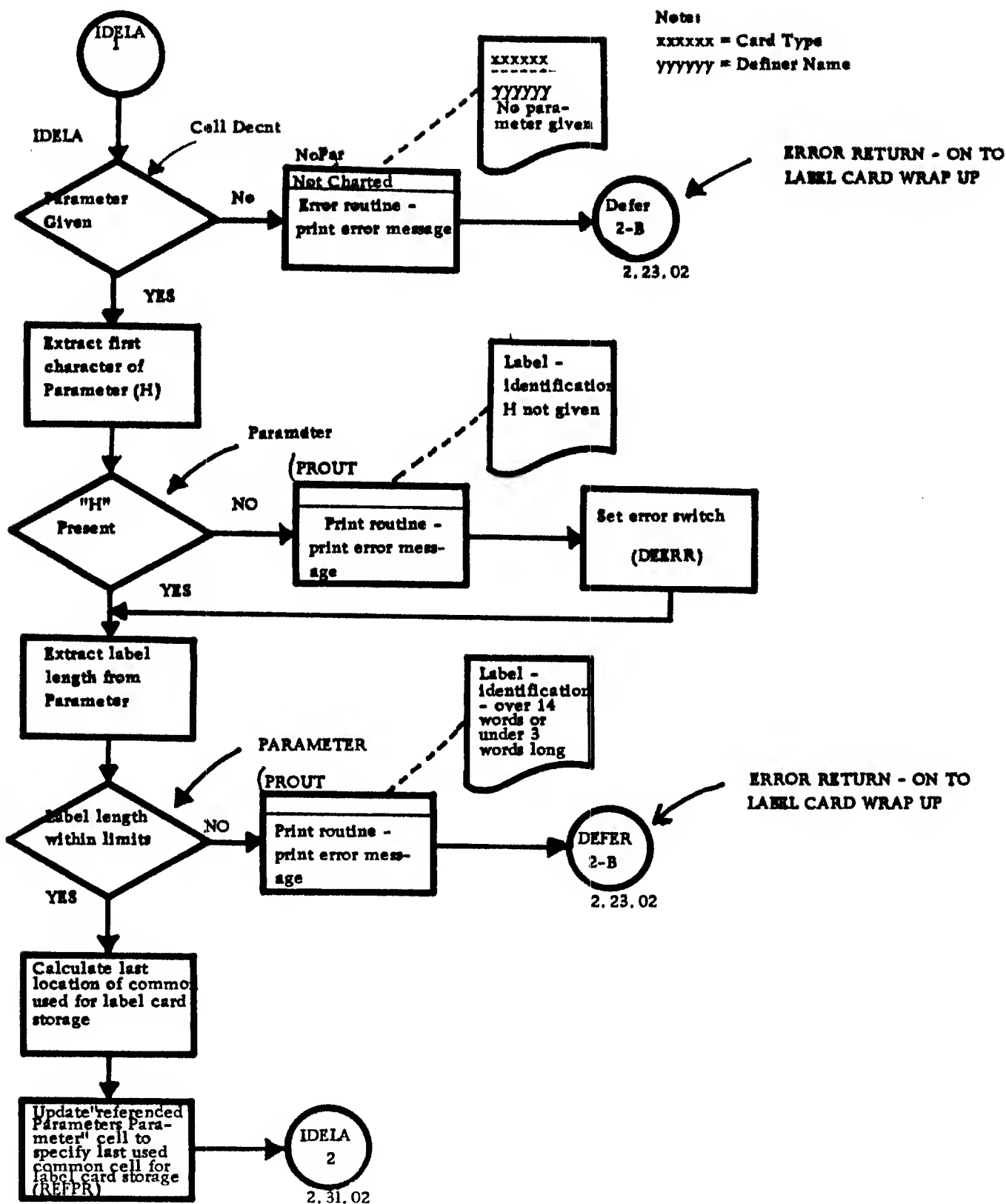


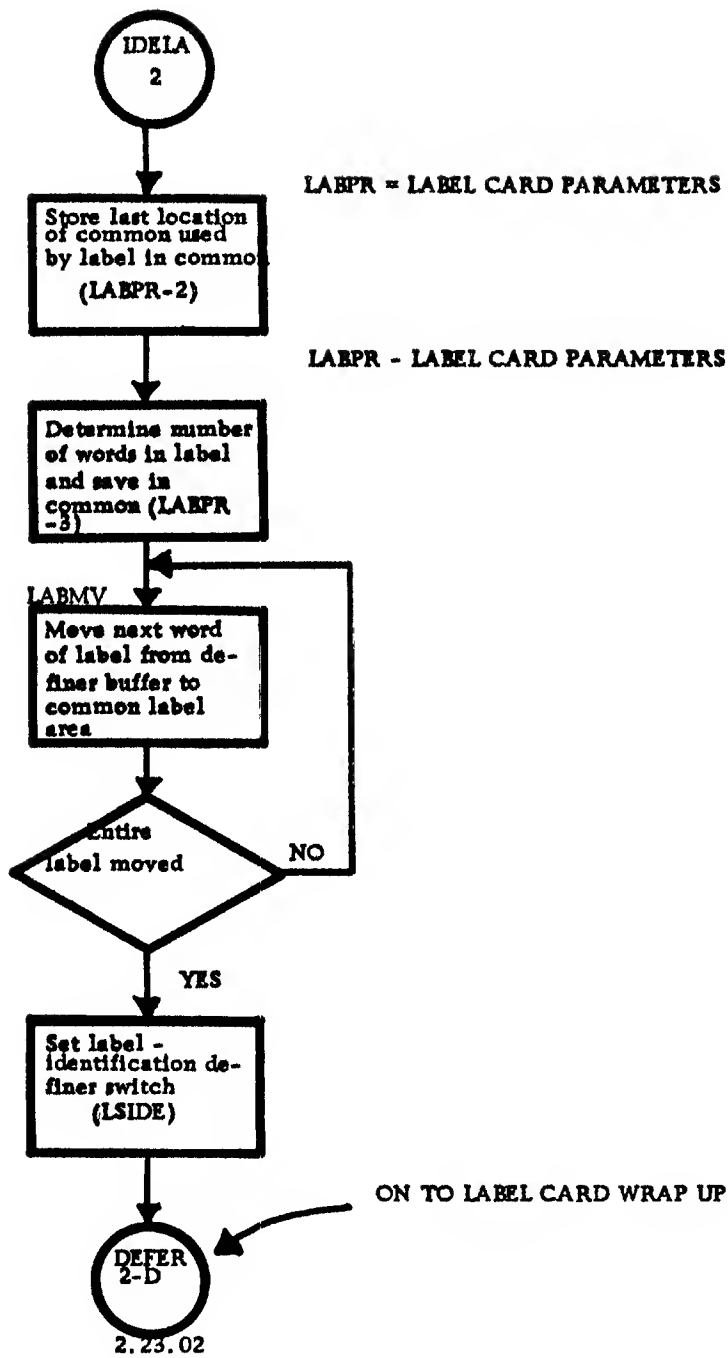


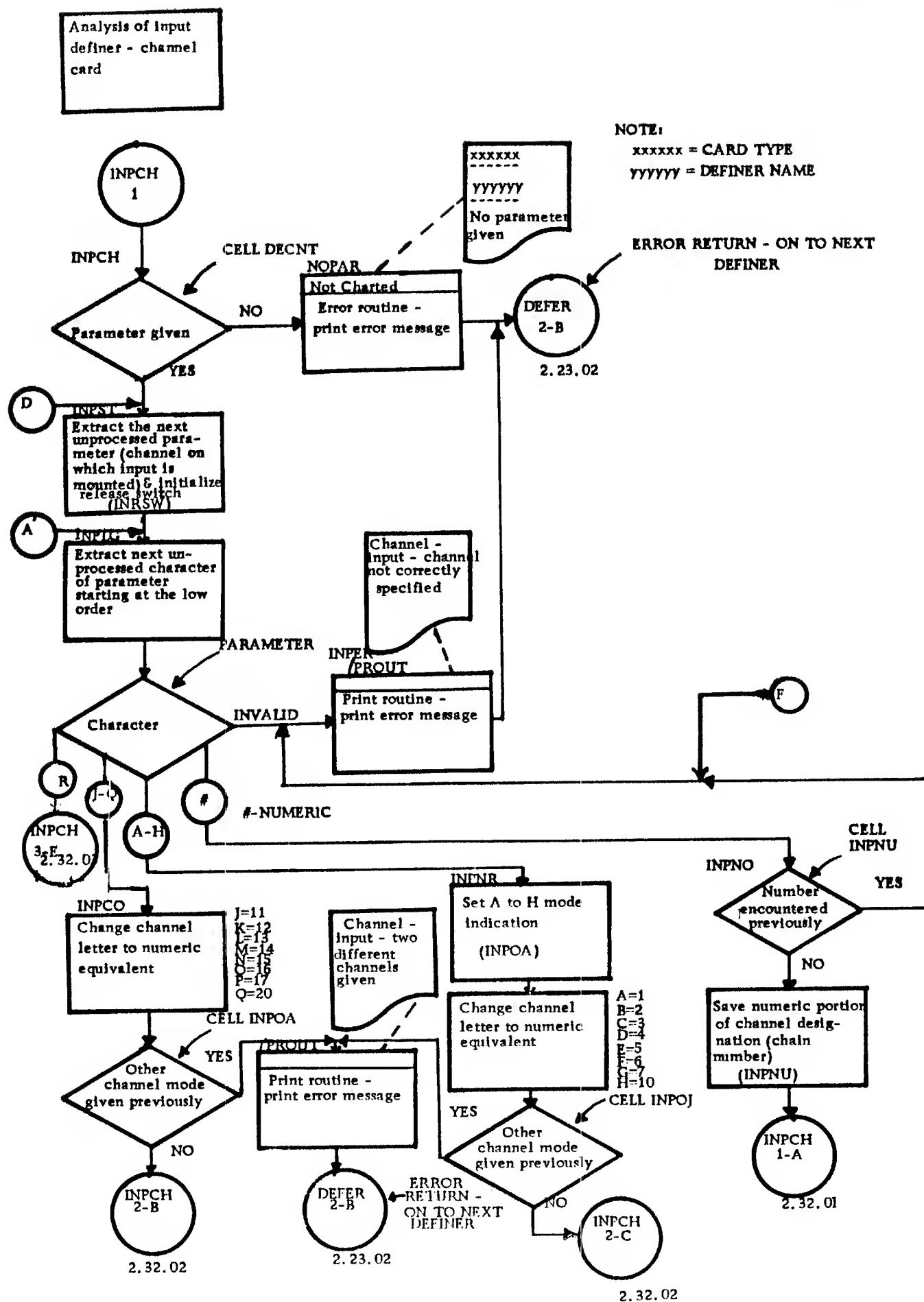


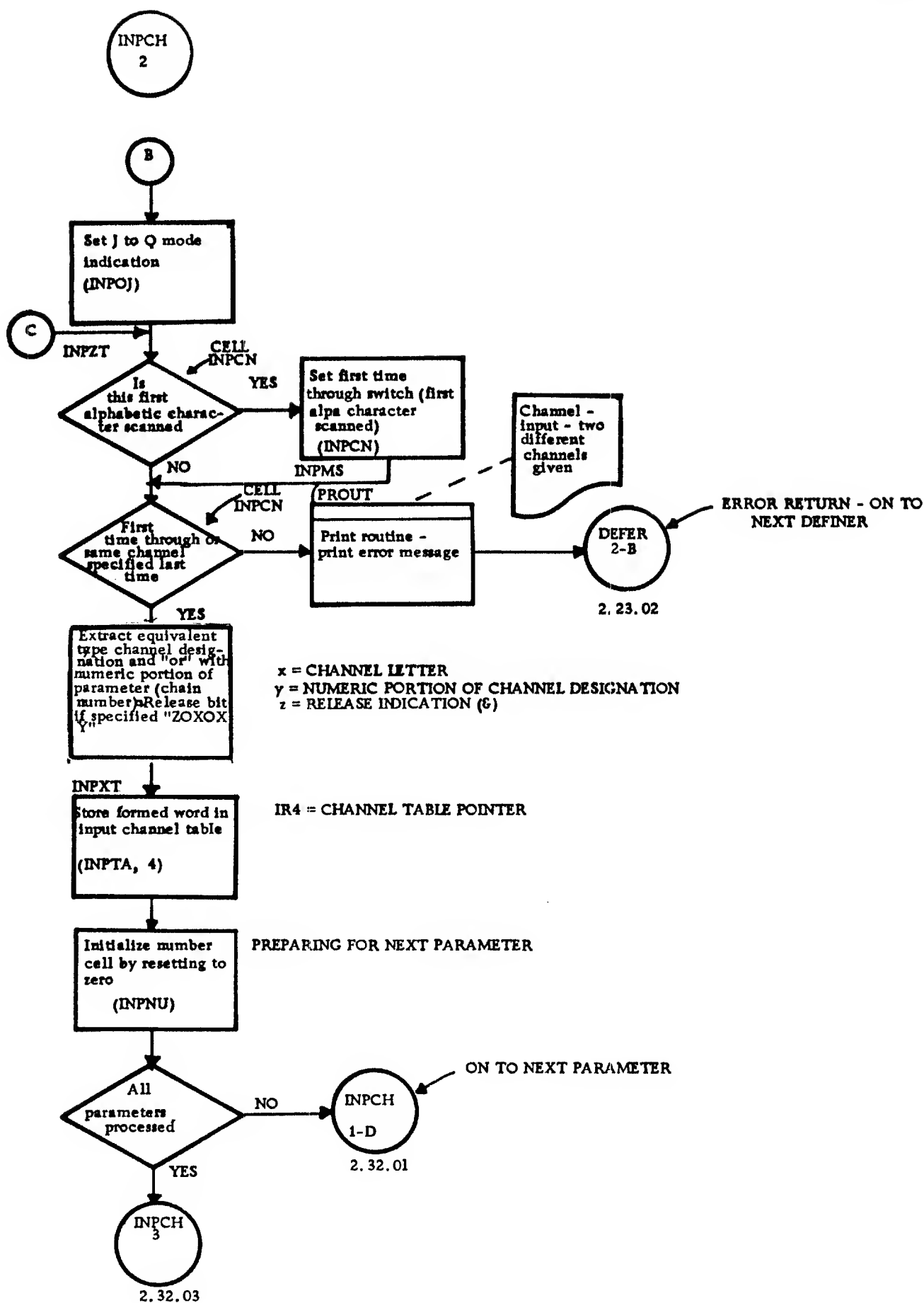


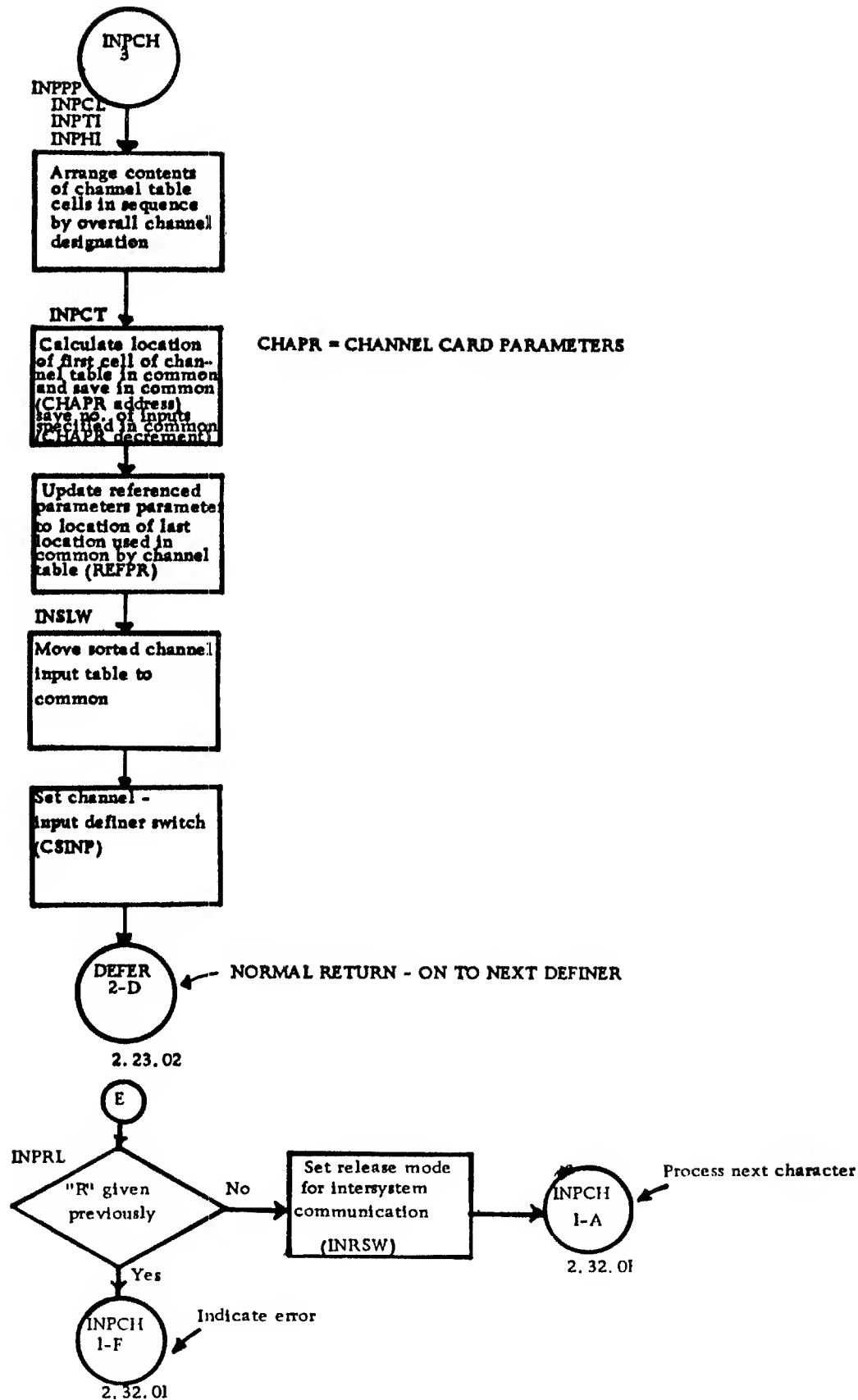
Analysis of  
identification  
definer - label  
card

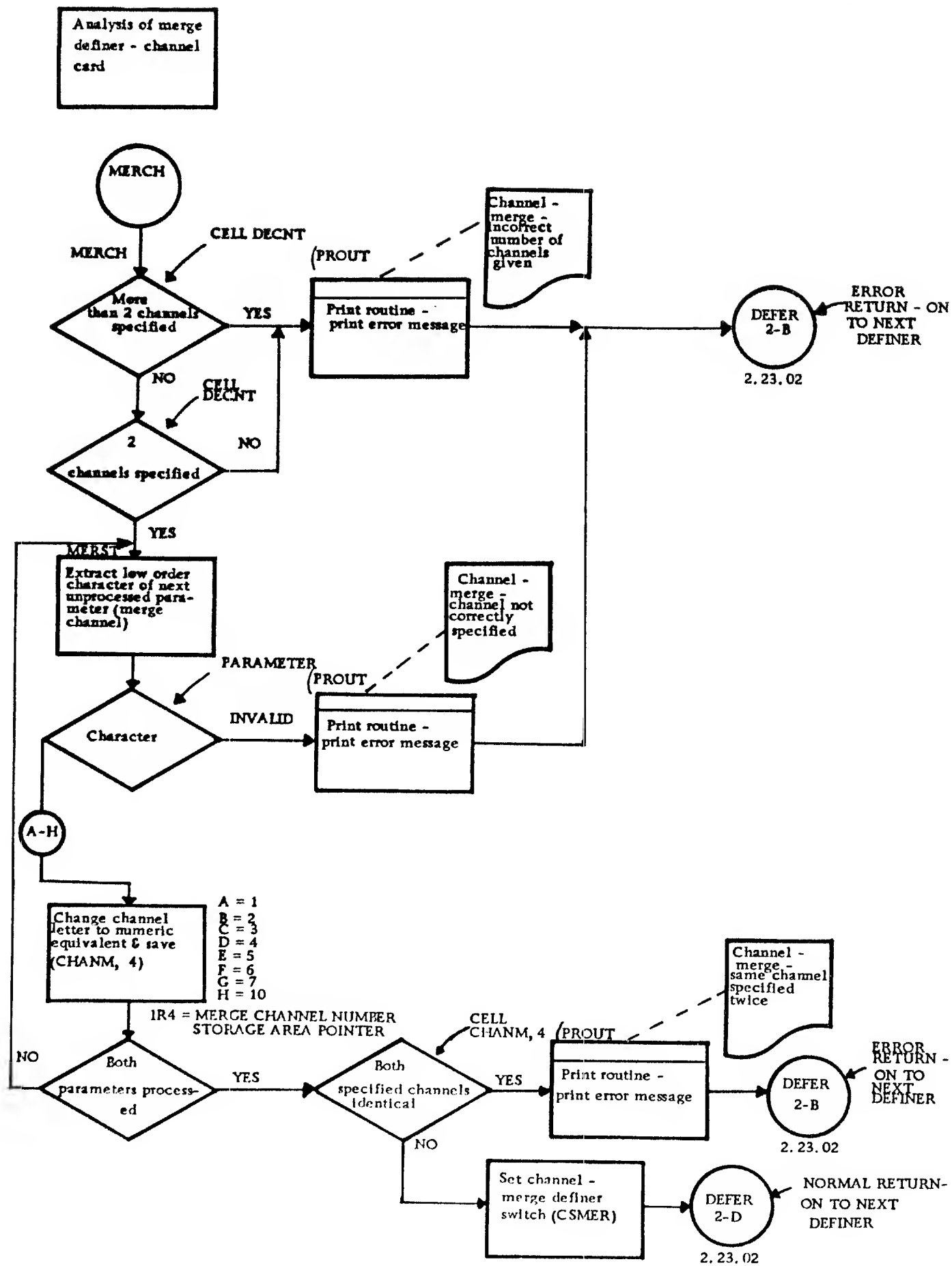


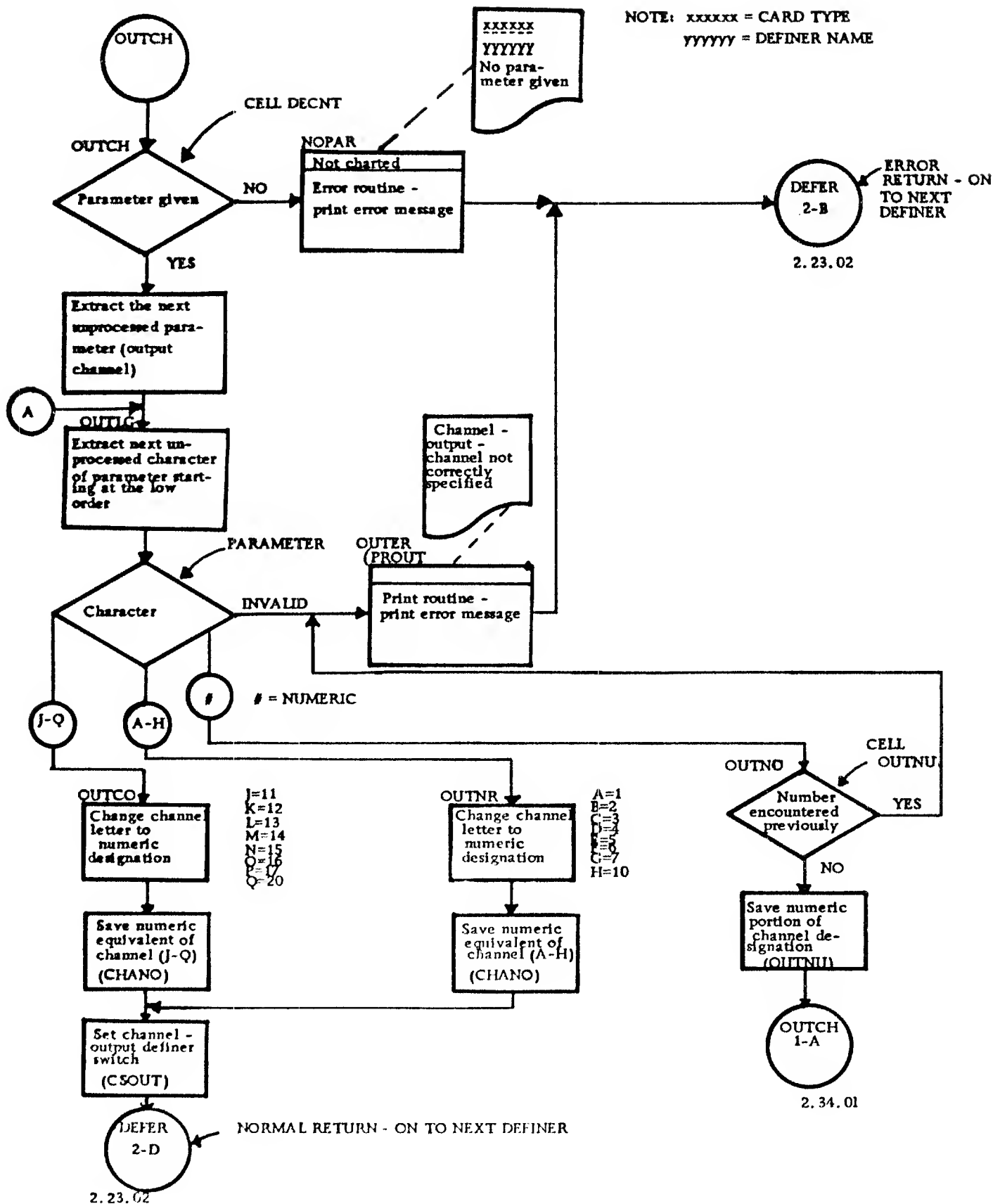






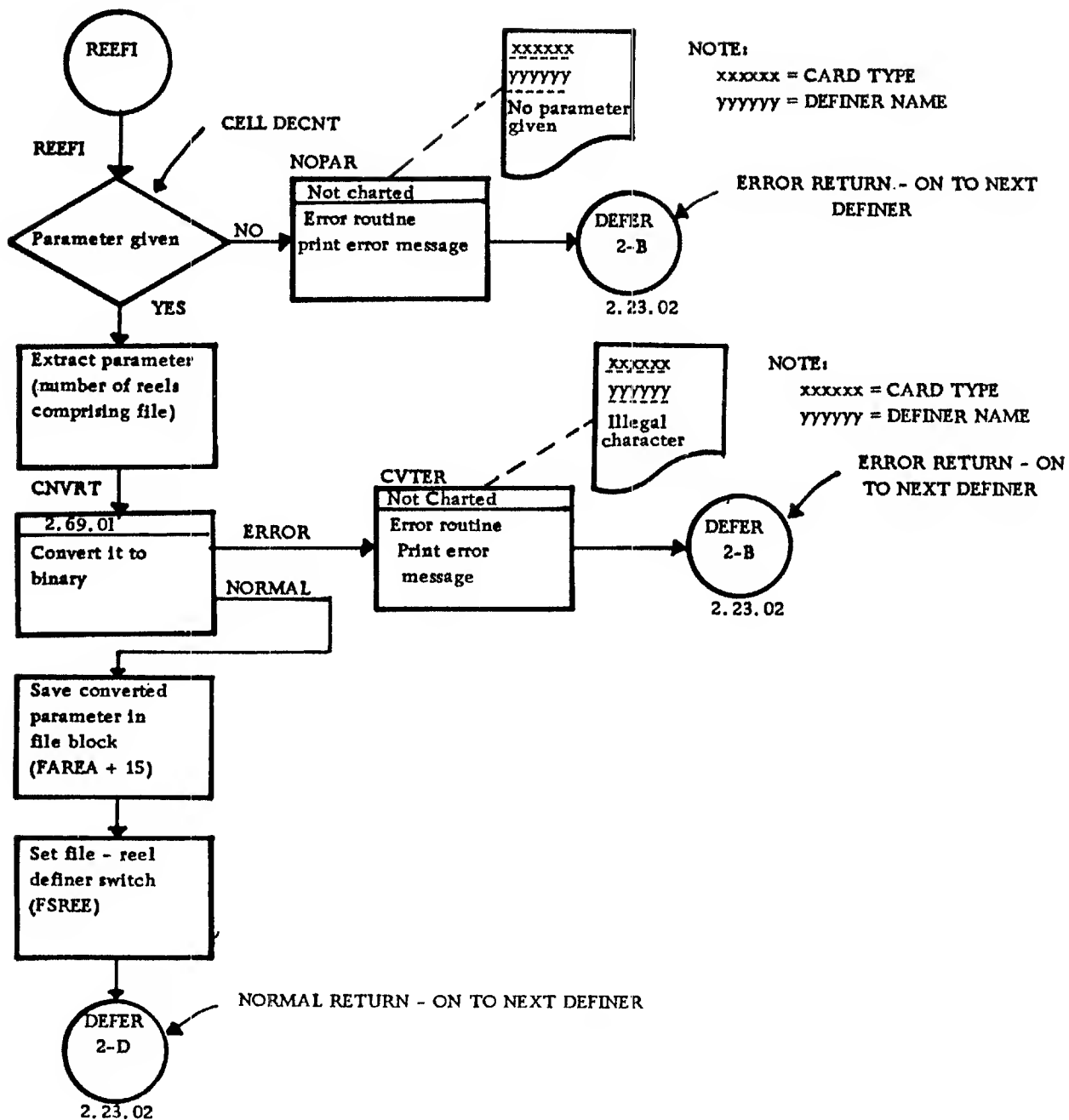




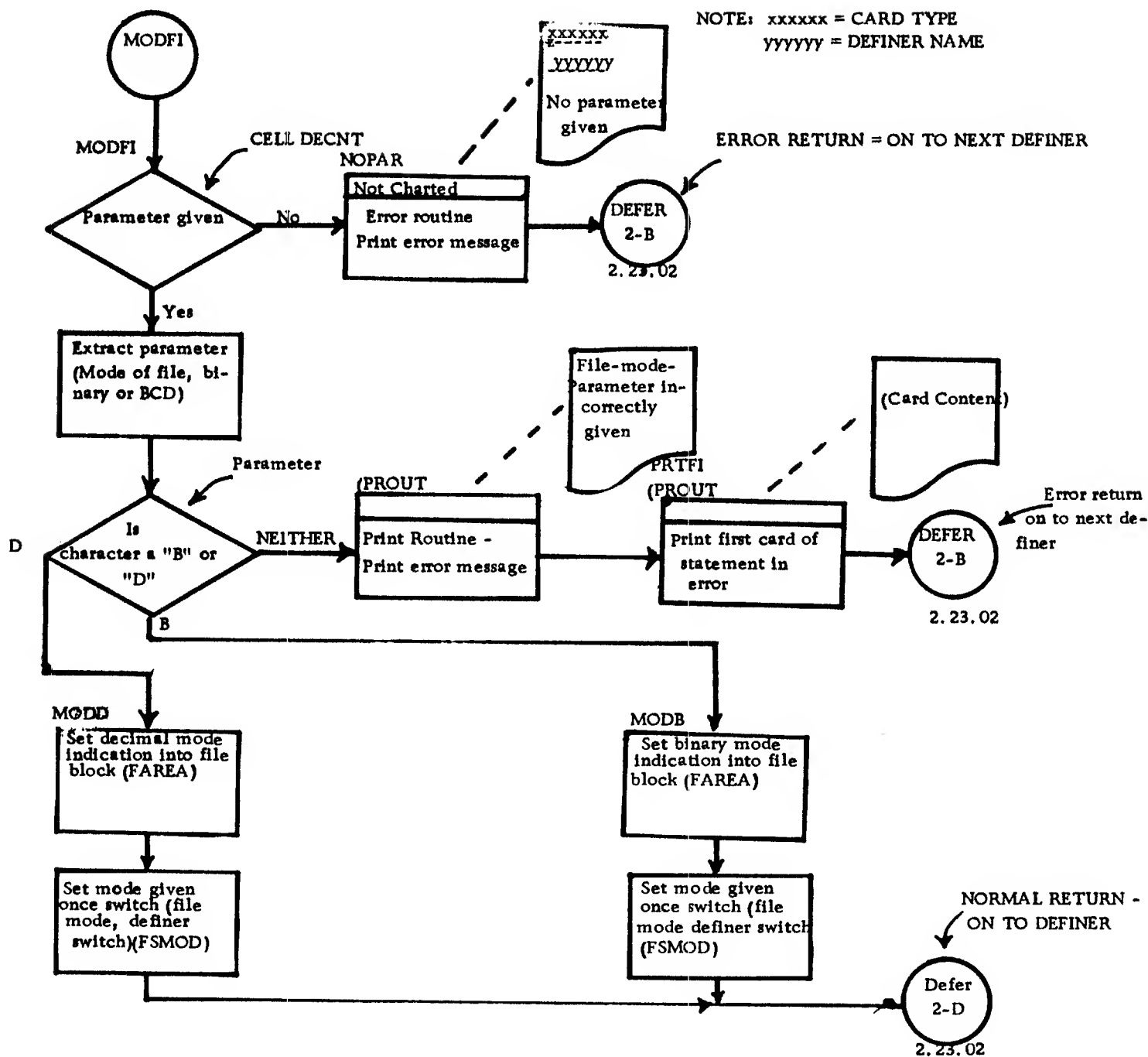




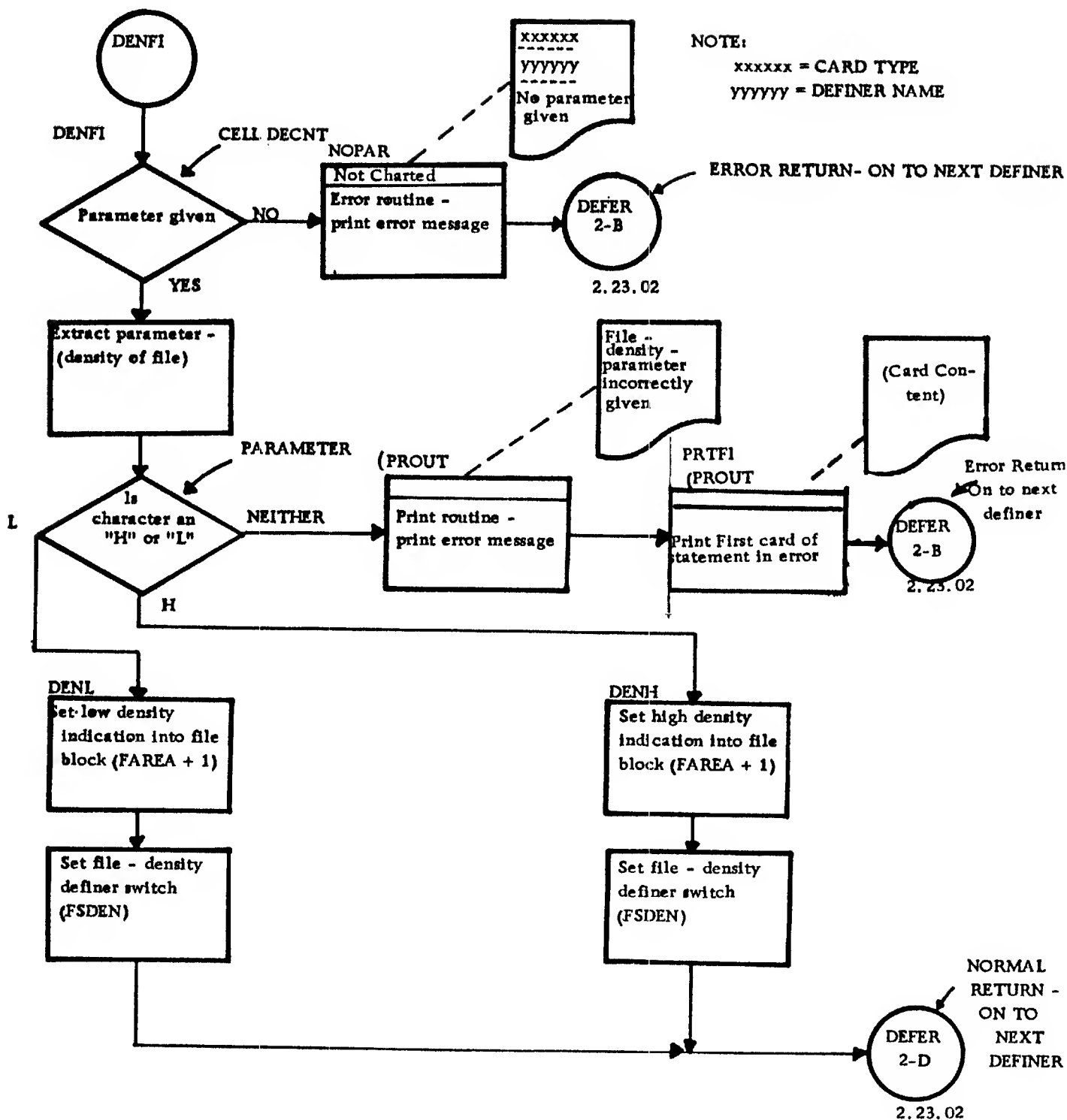
Analysis of reels -  
file card

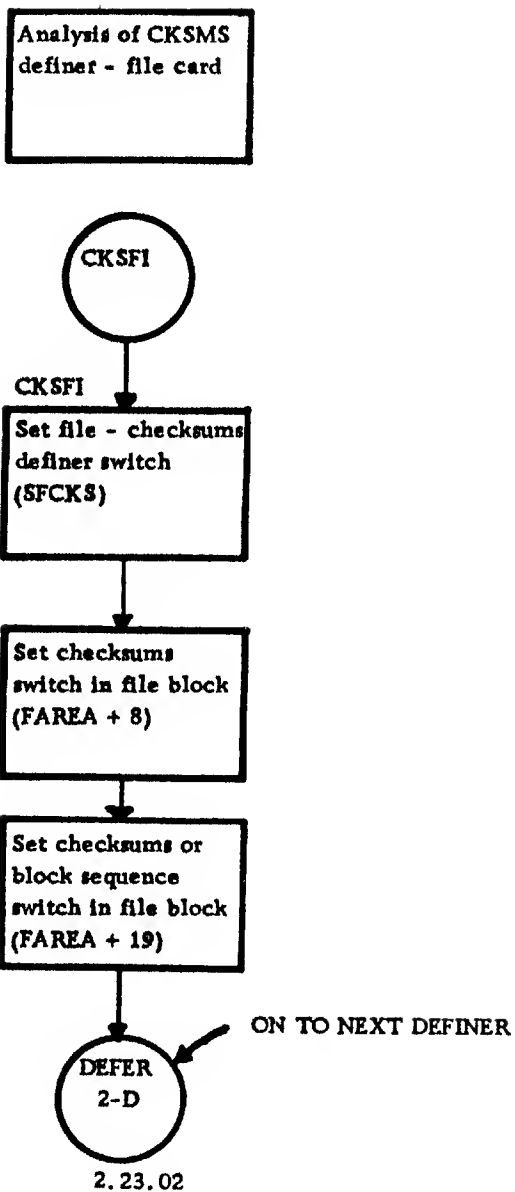


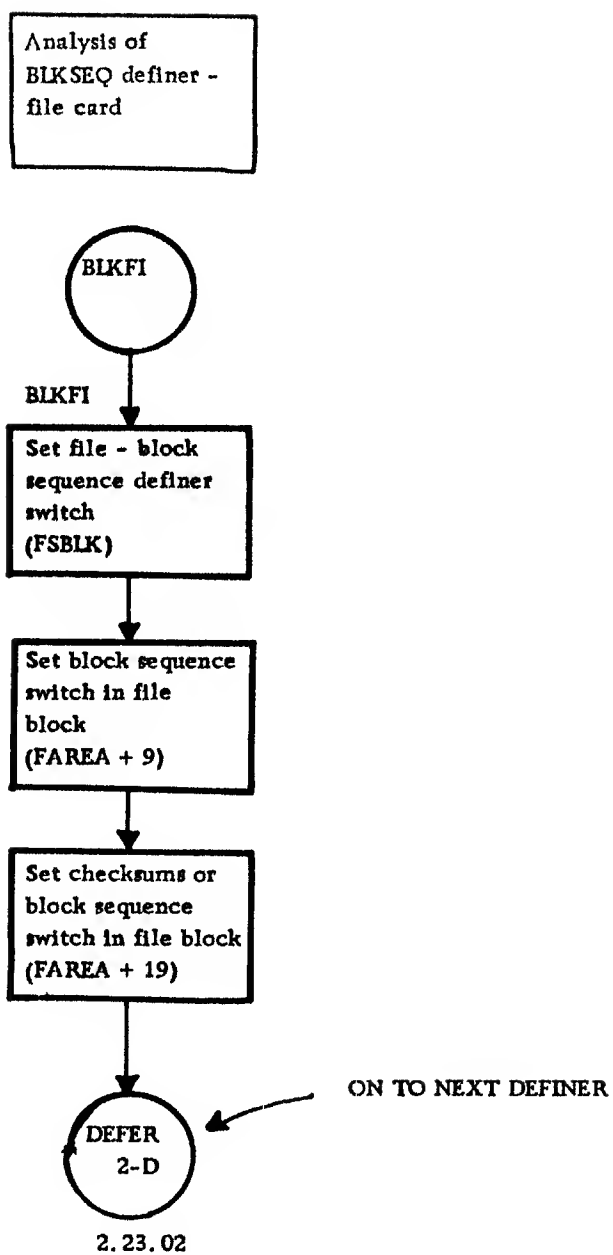
Analysis of mode  
definer - file card

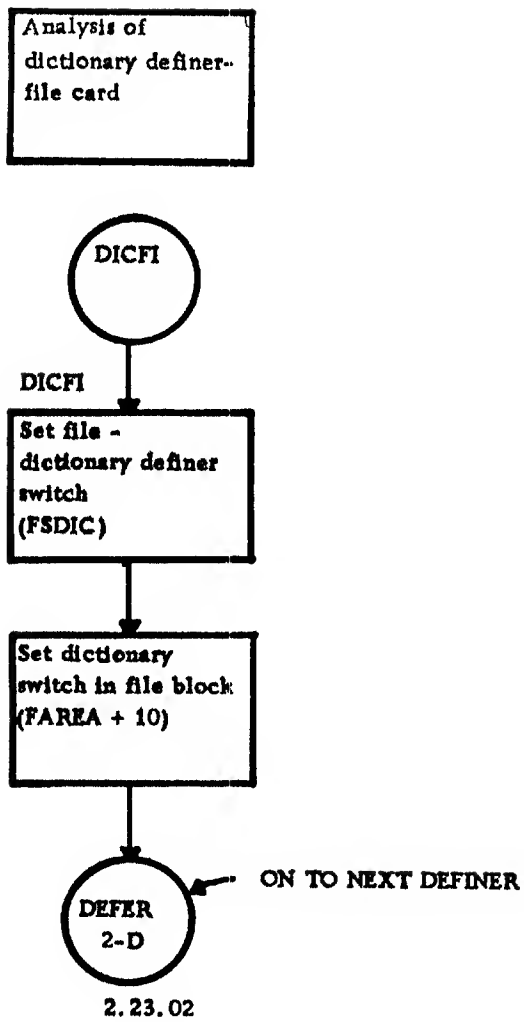


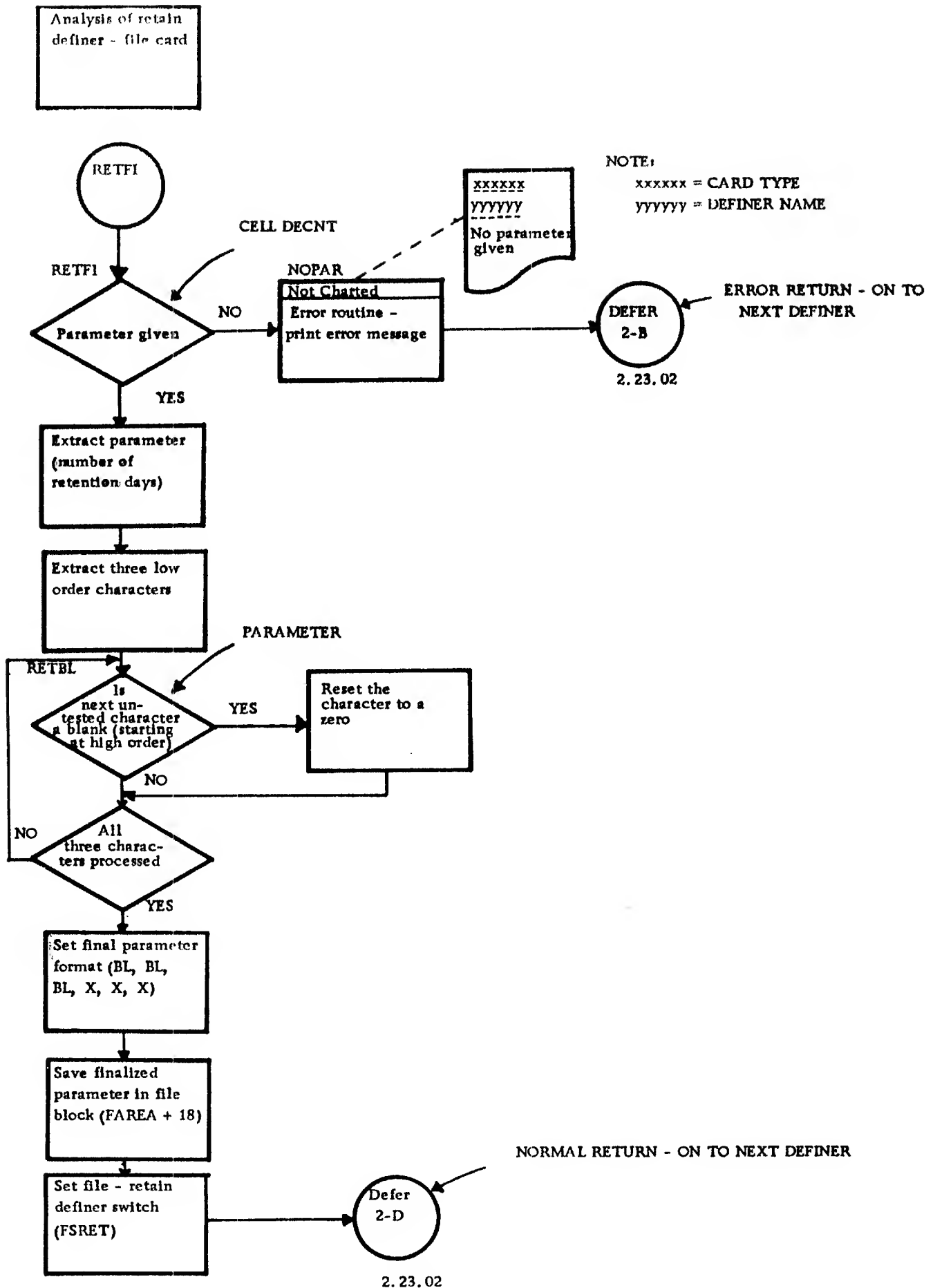
Analysis of density  
definer - file card

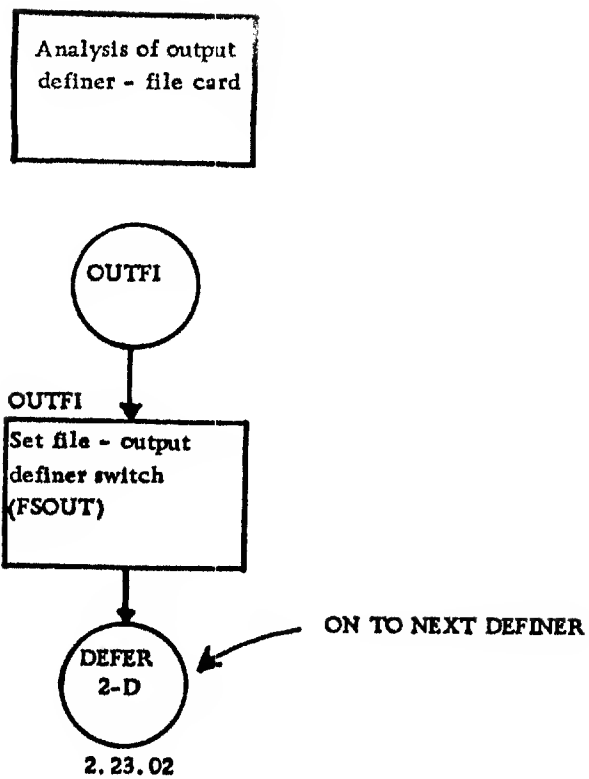




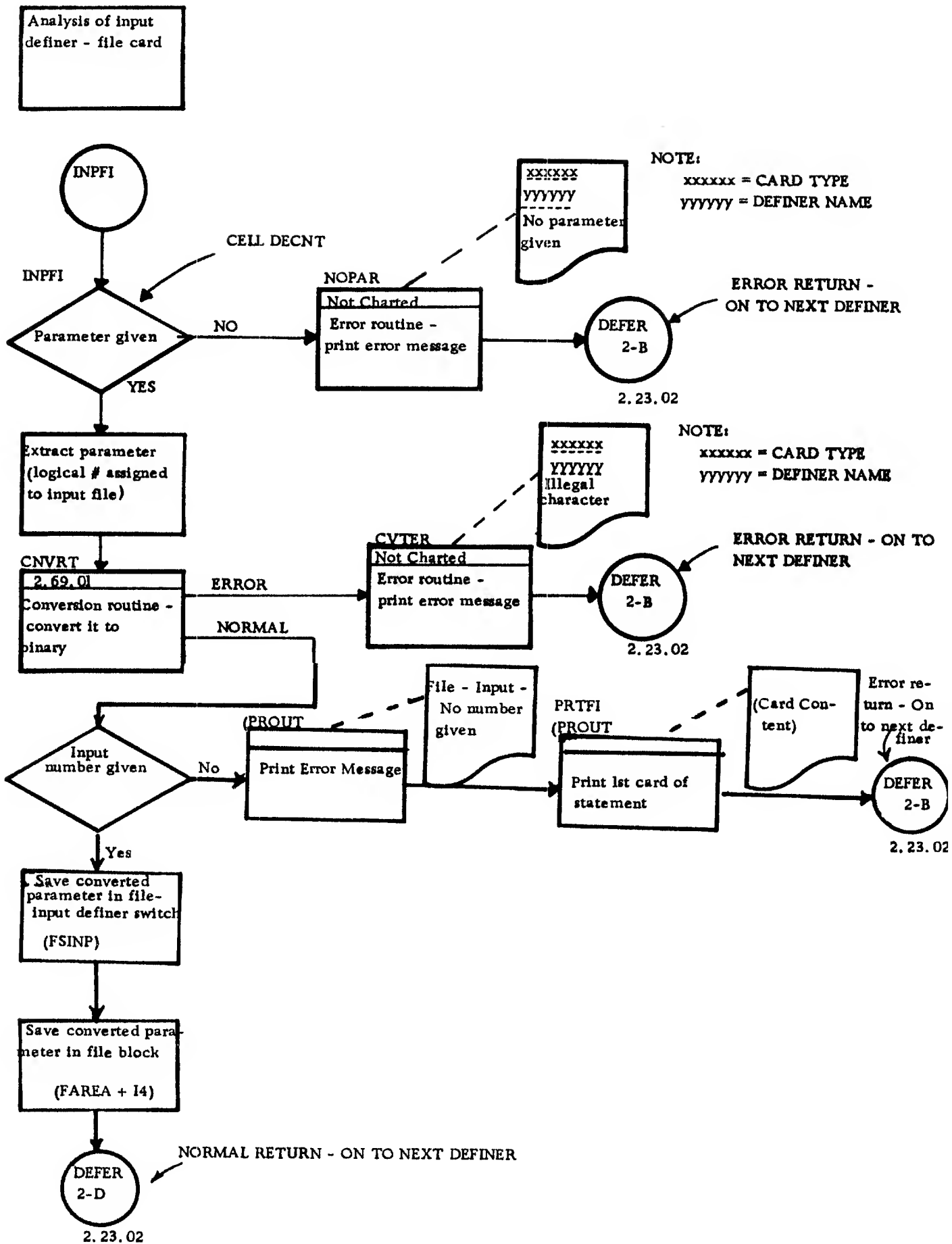


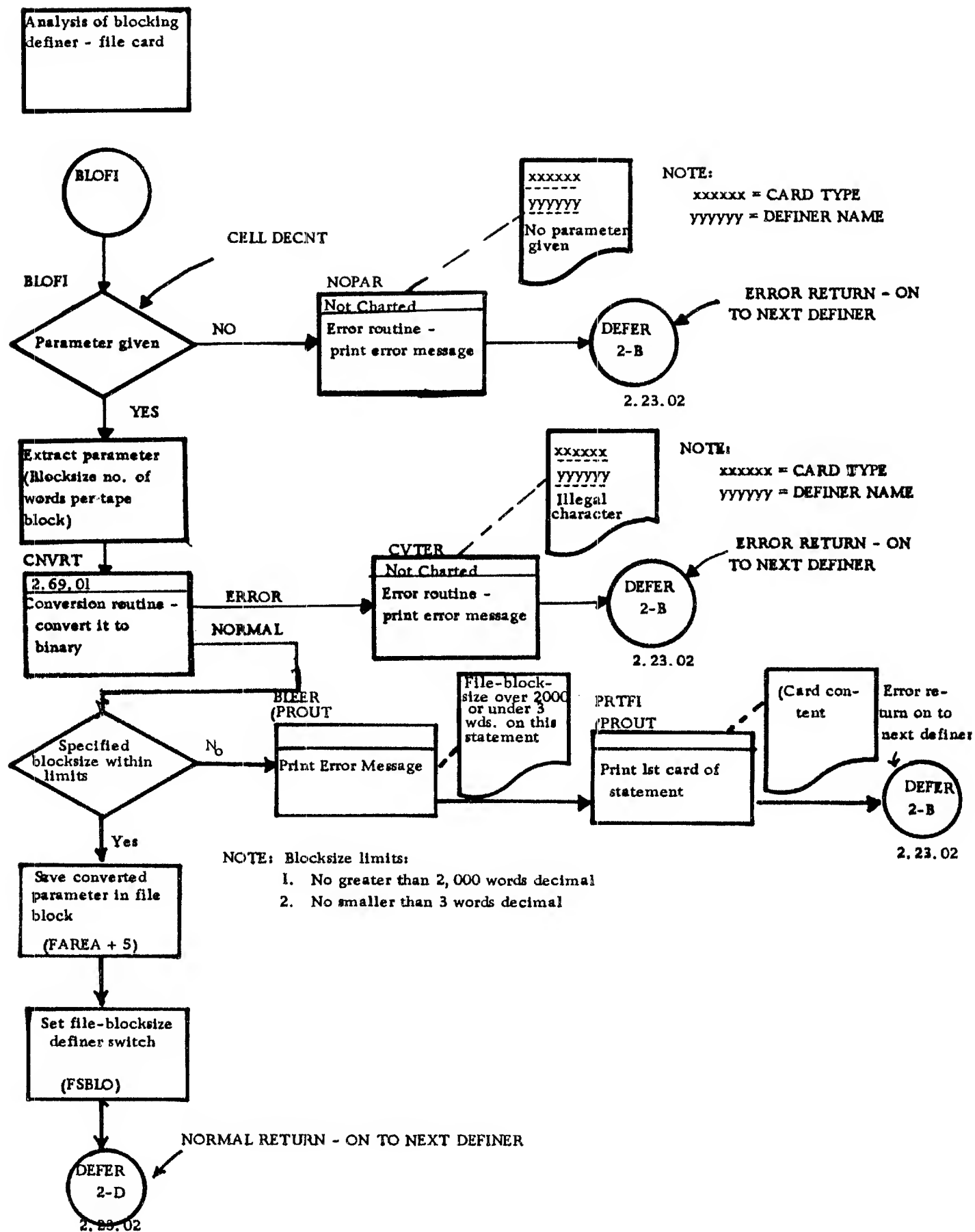




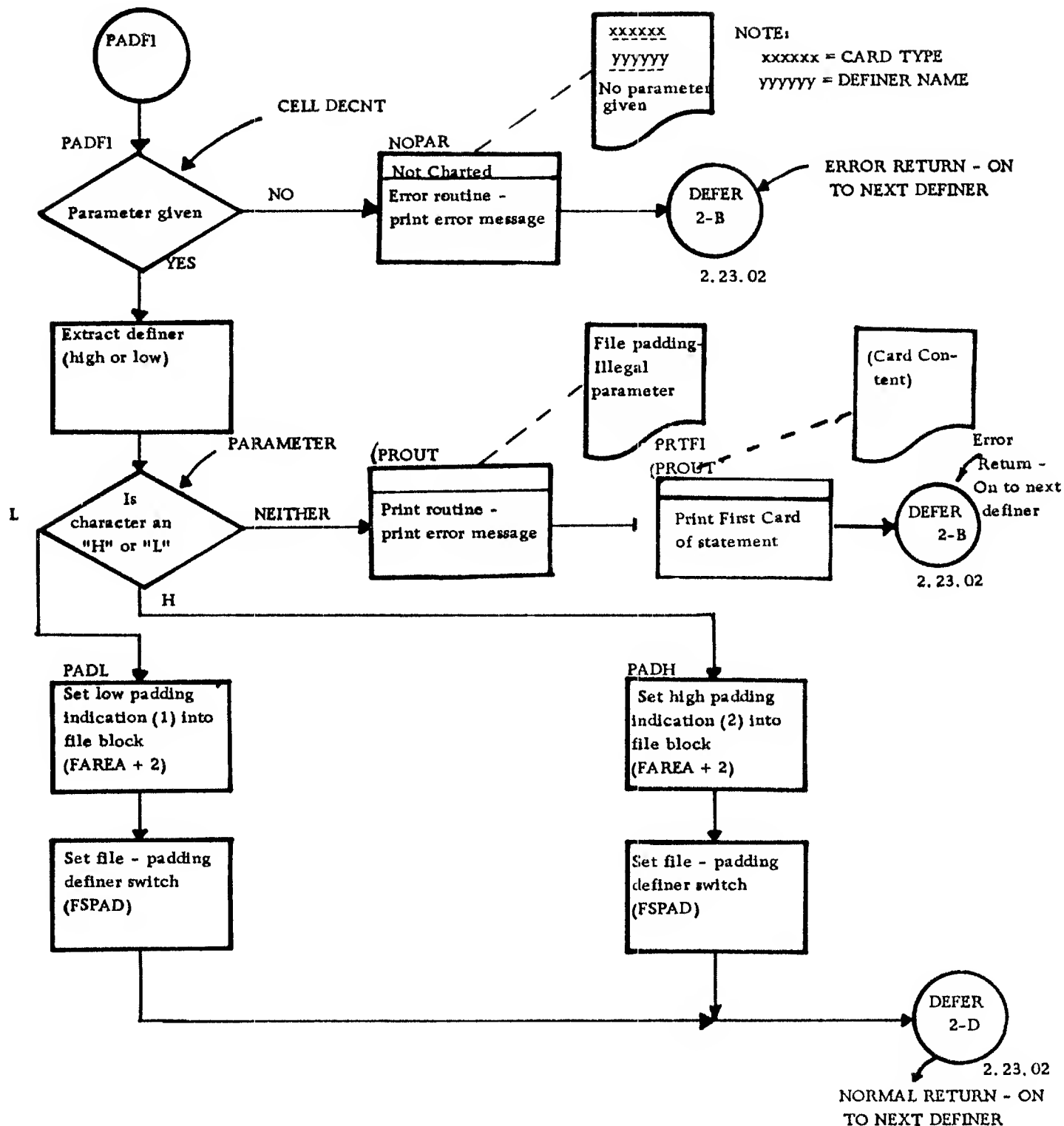




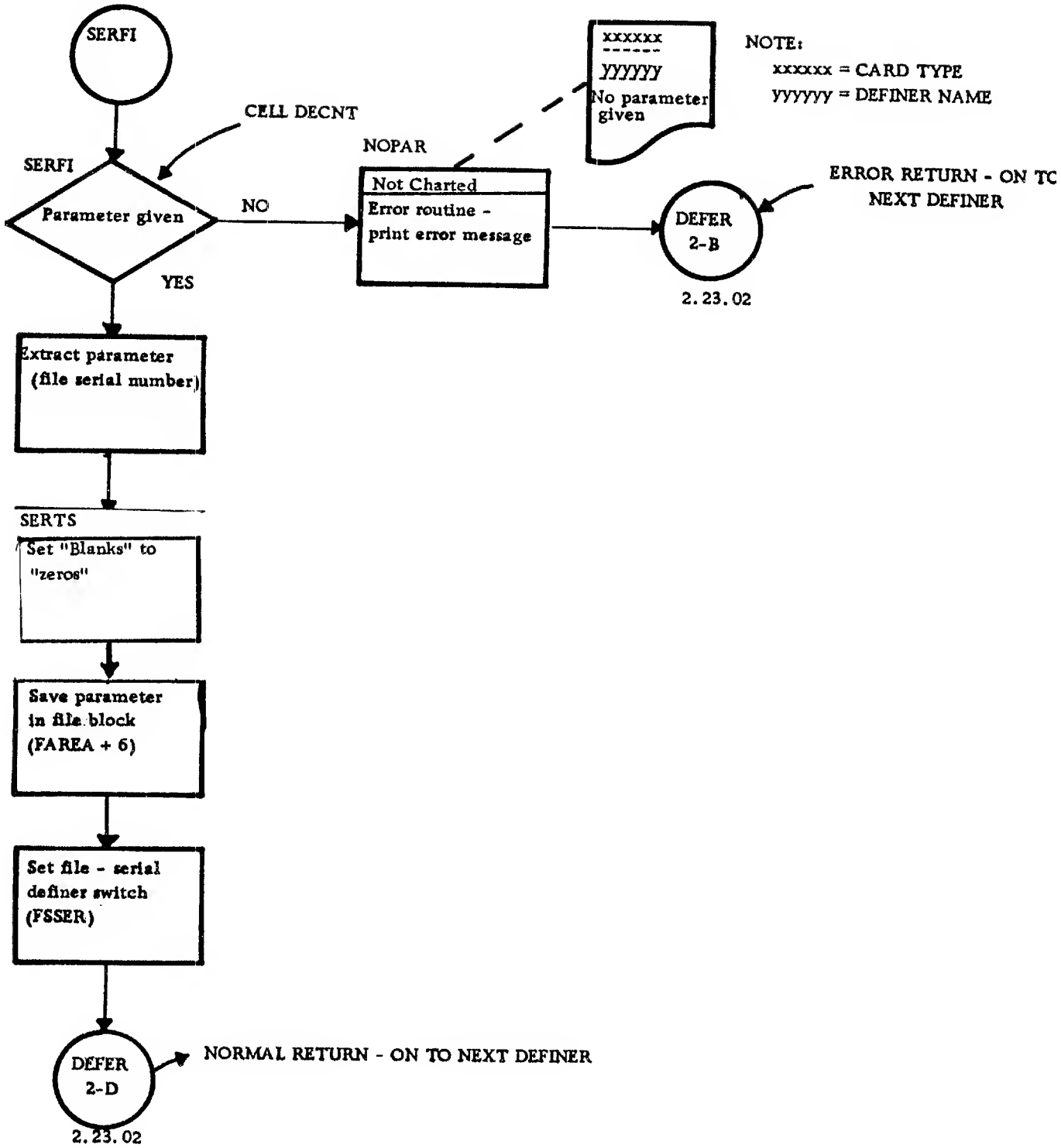


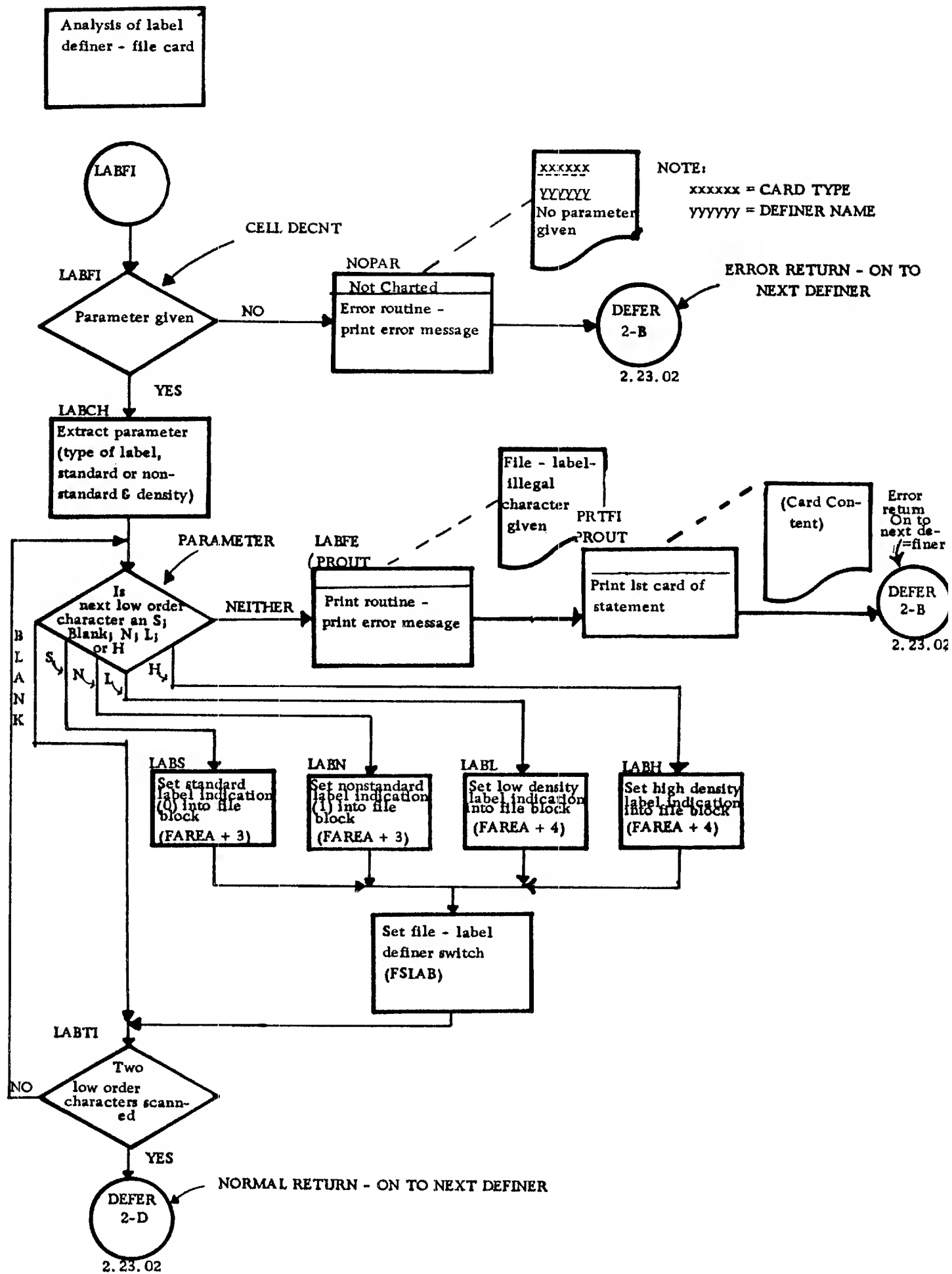


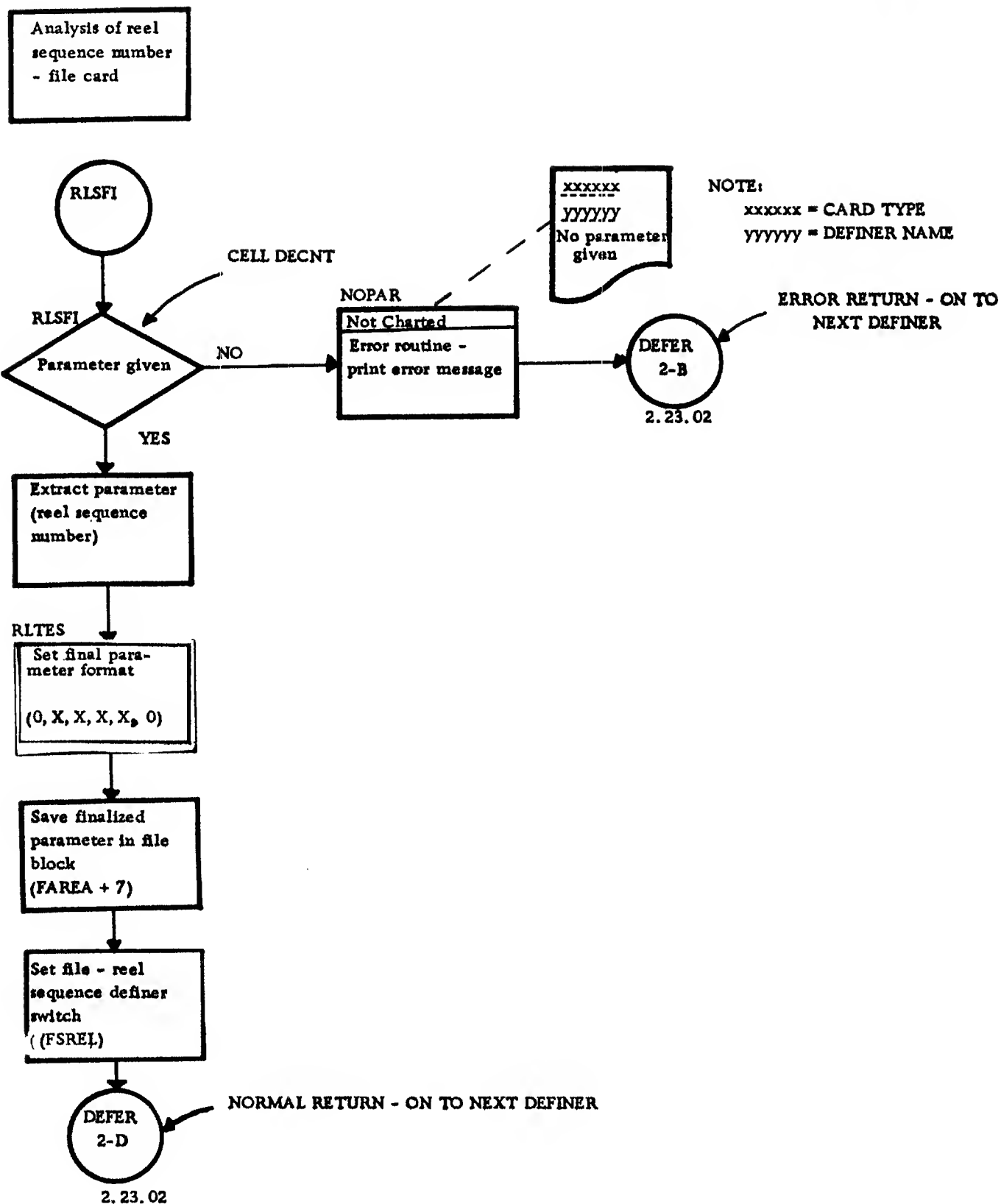
Analysis of  
padding definer -  
file card



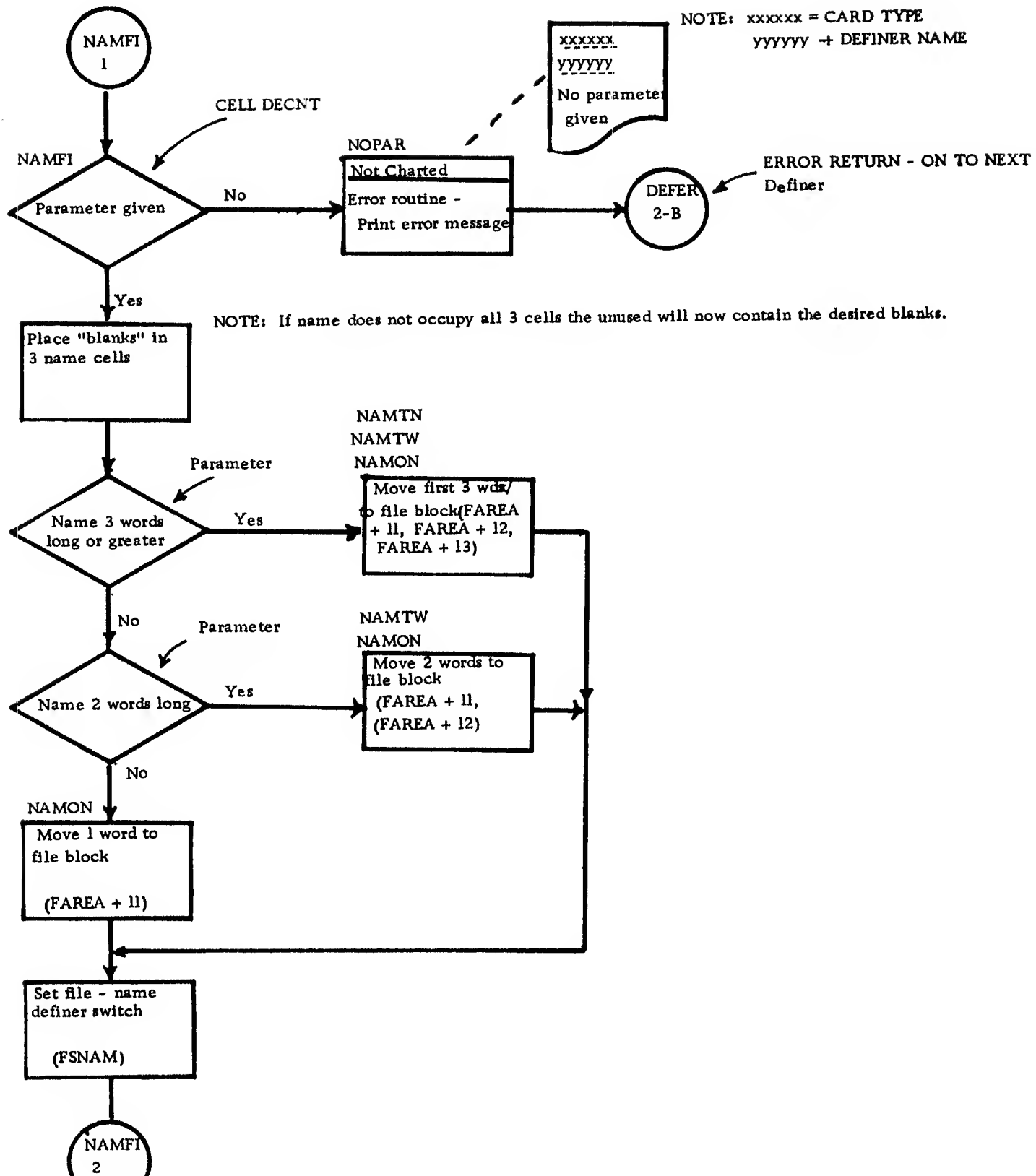
Analysis of serial  
number definer -  
file card

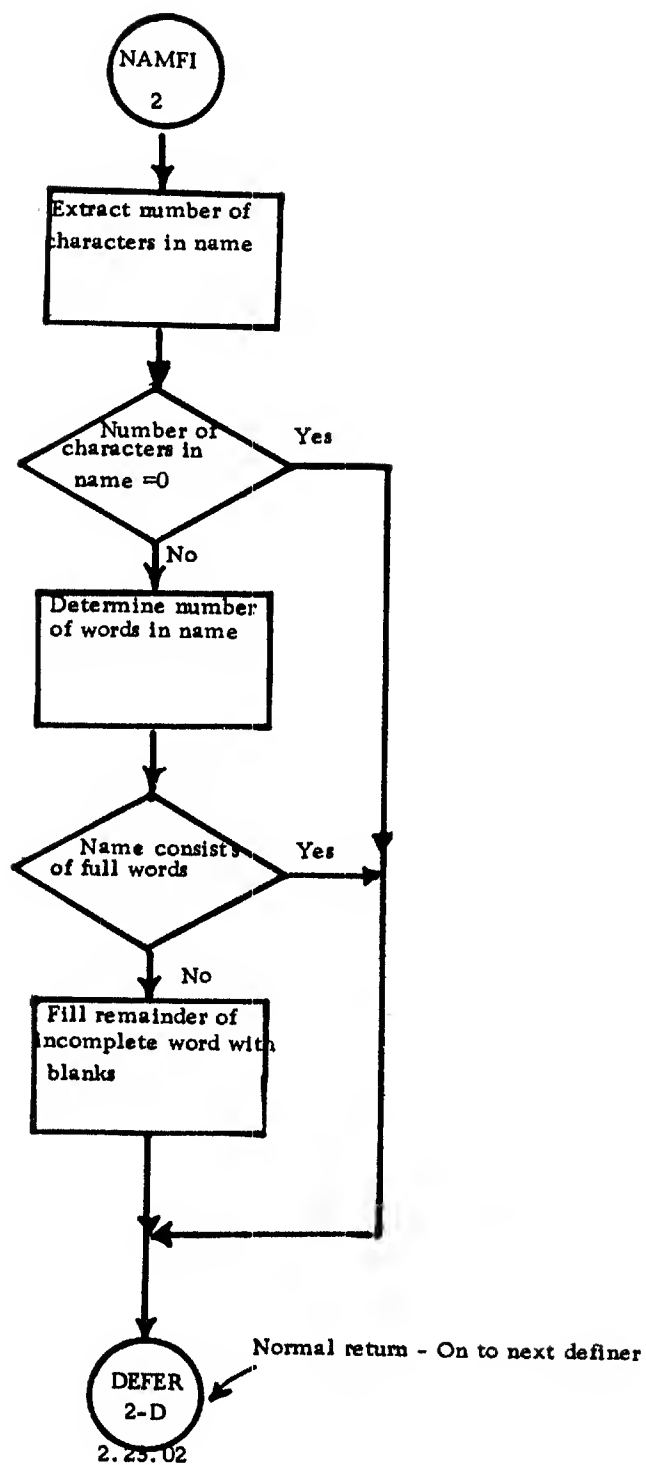




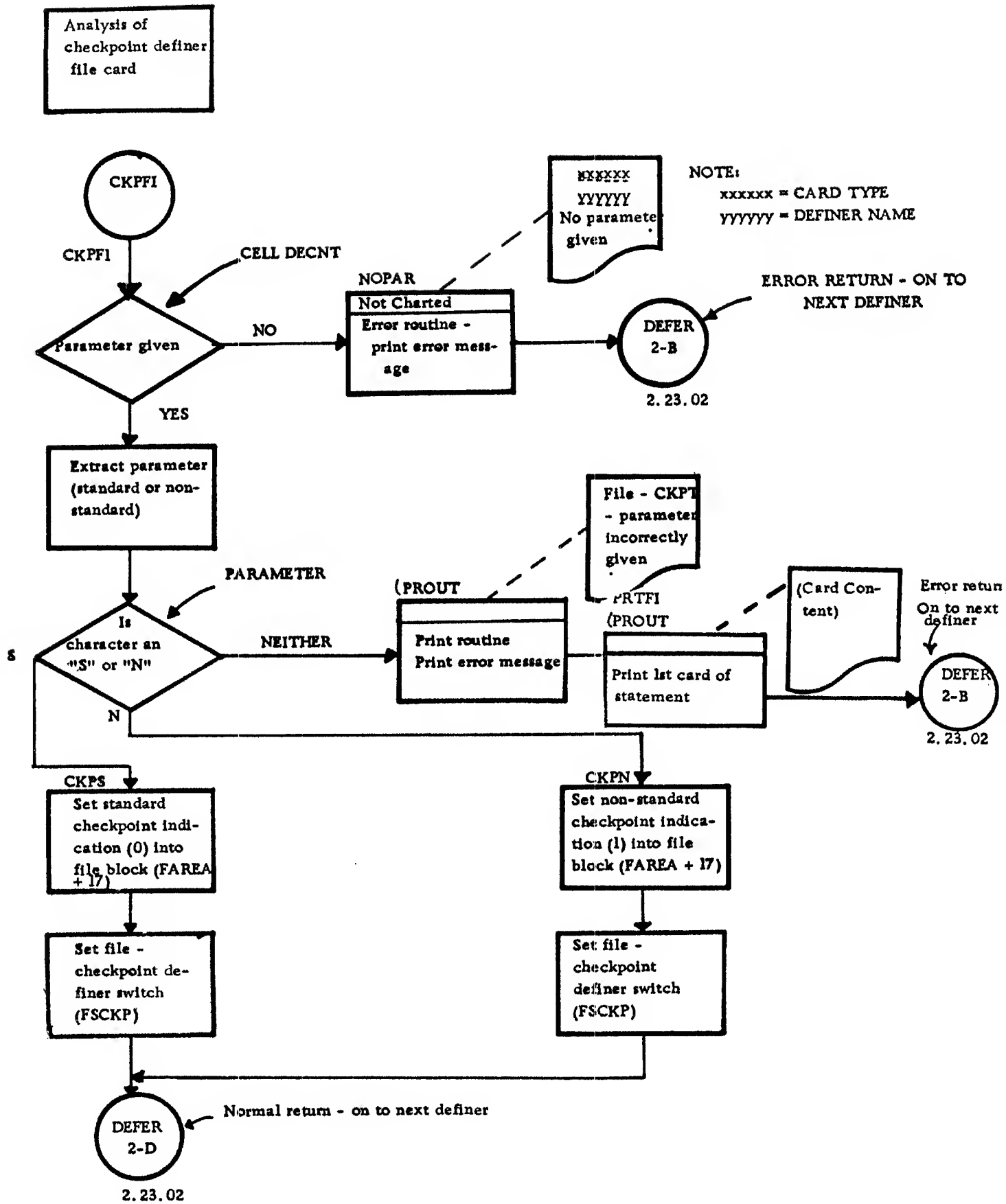


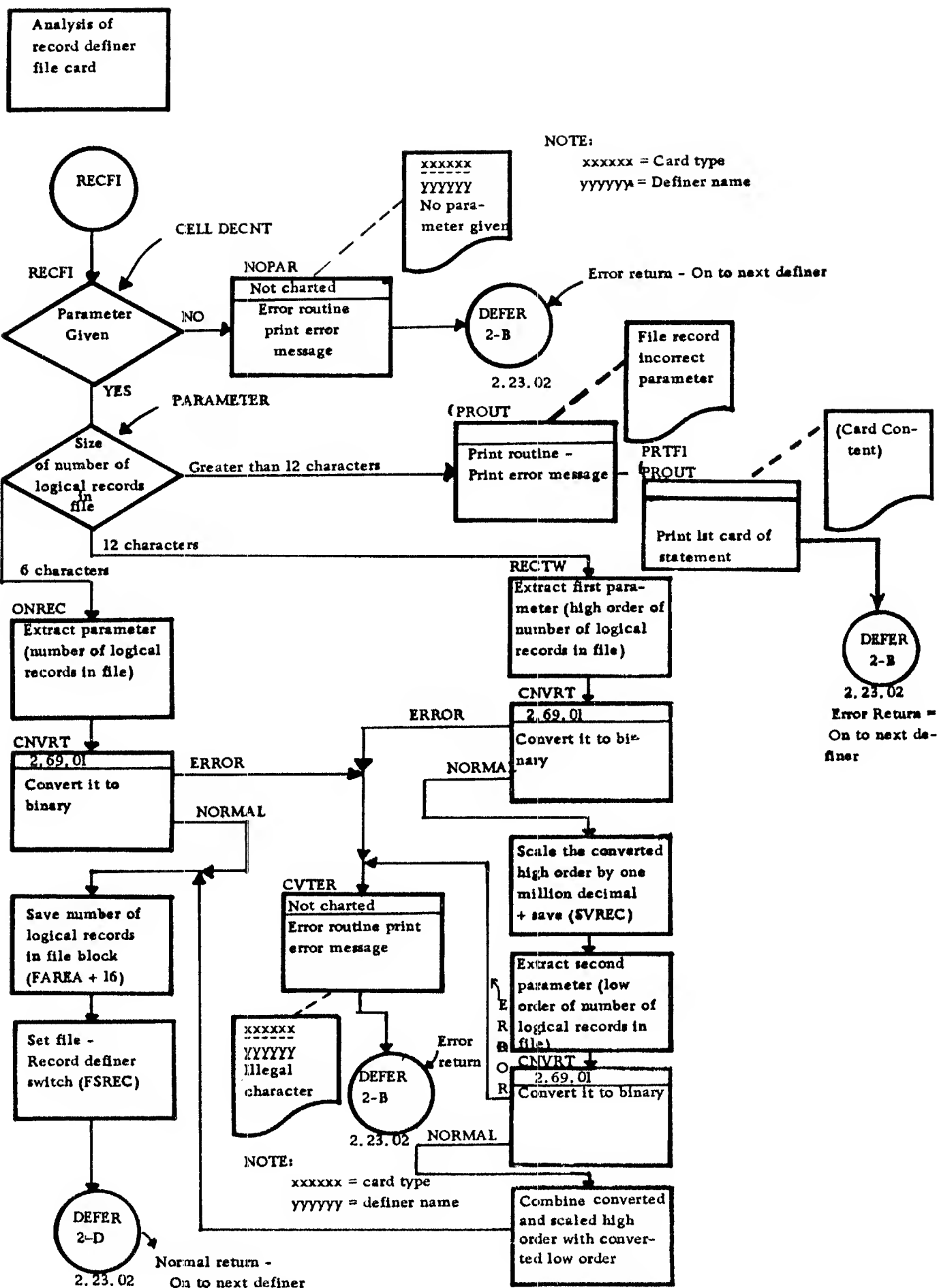
Analysis of name  
definer - file card

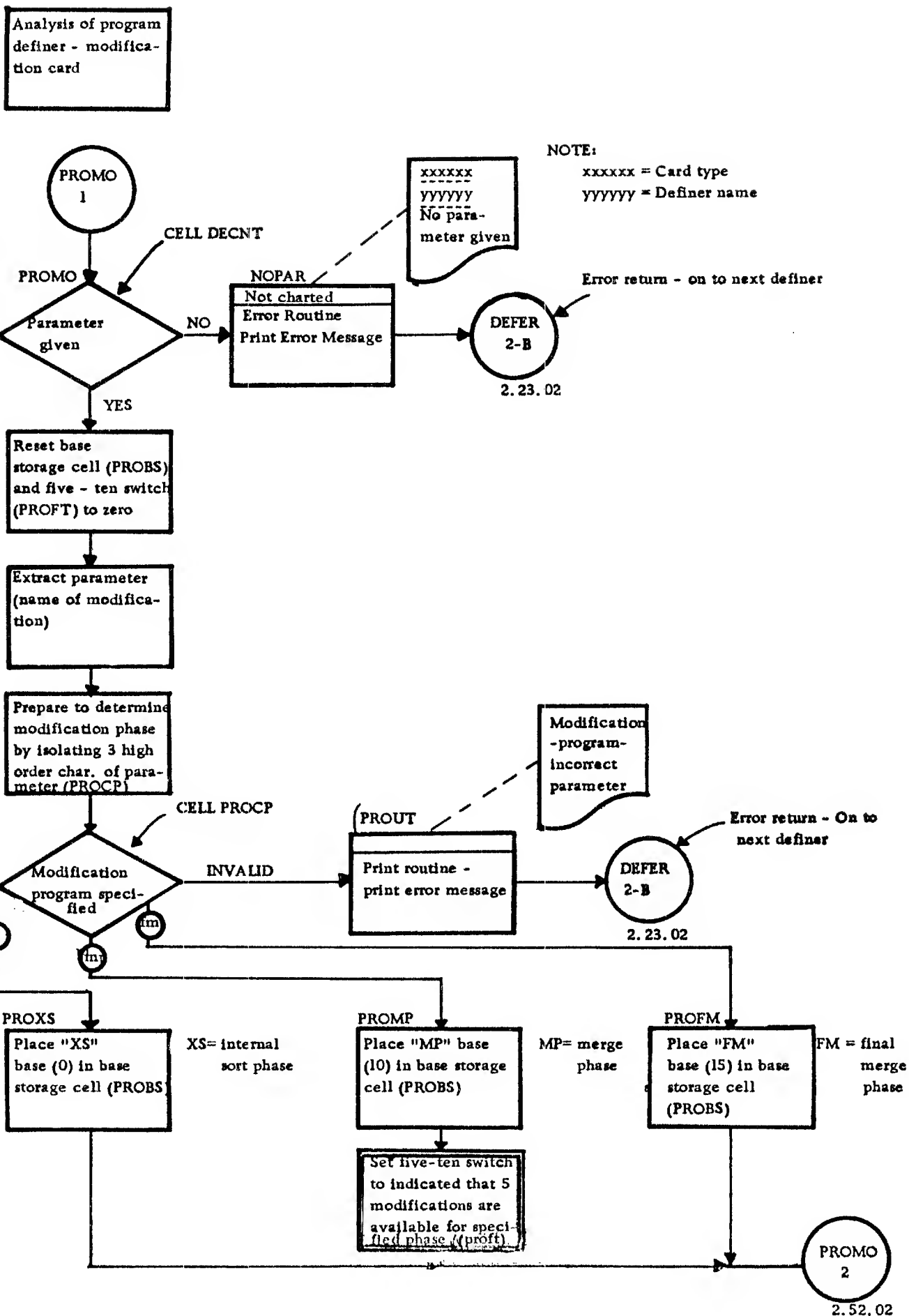


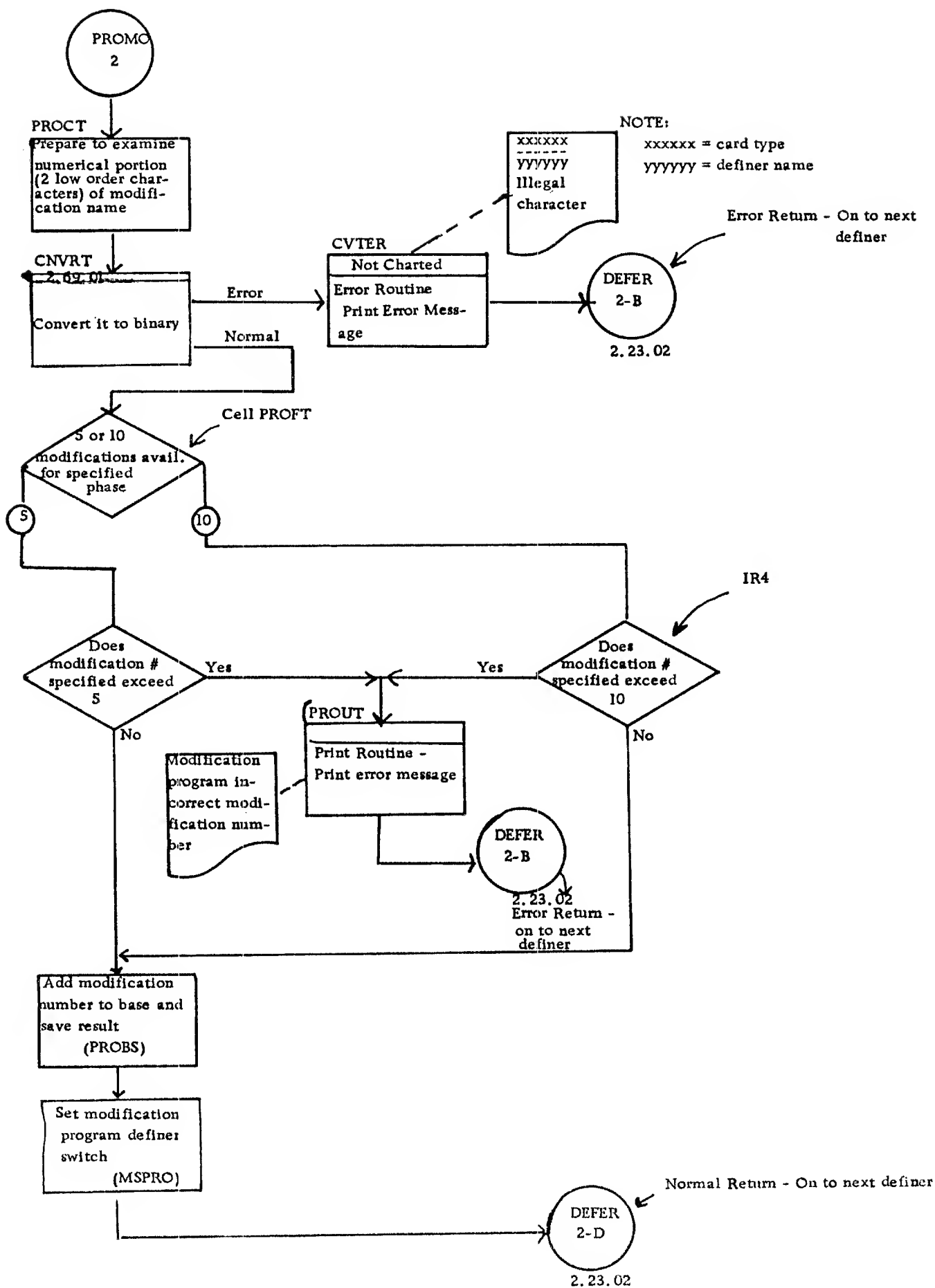


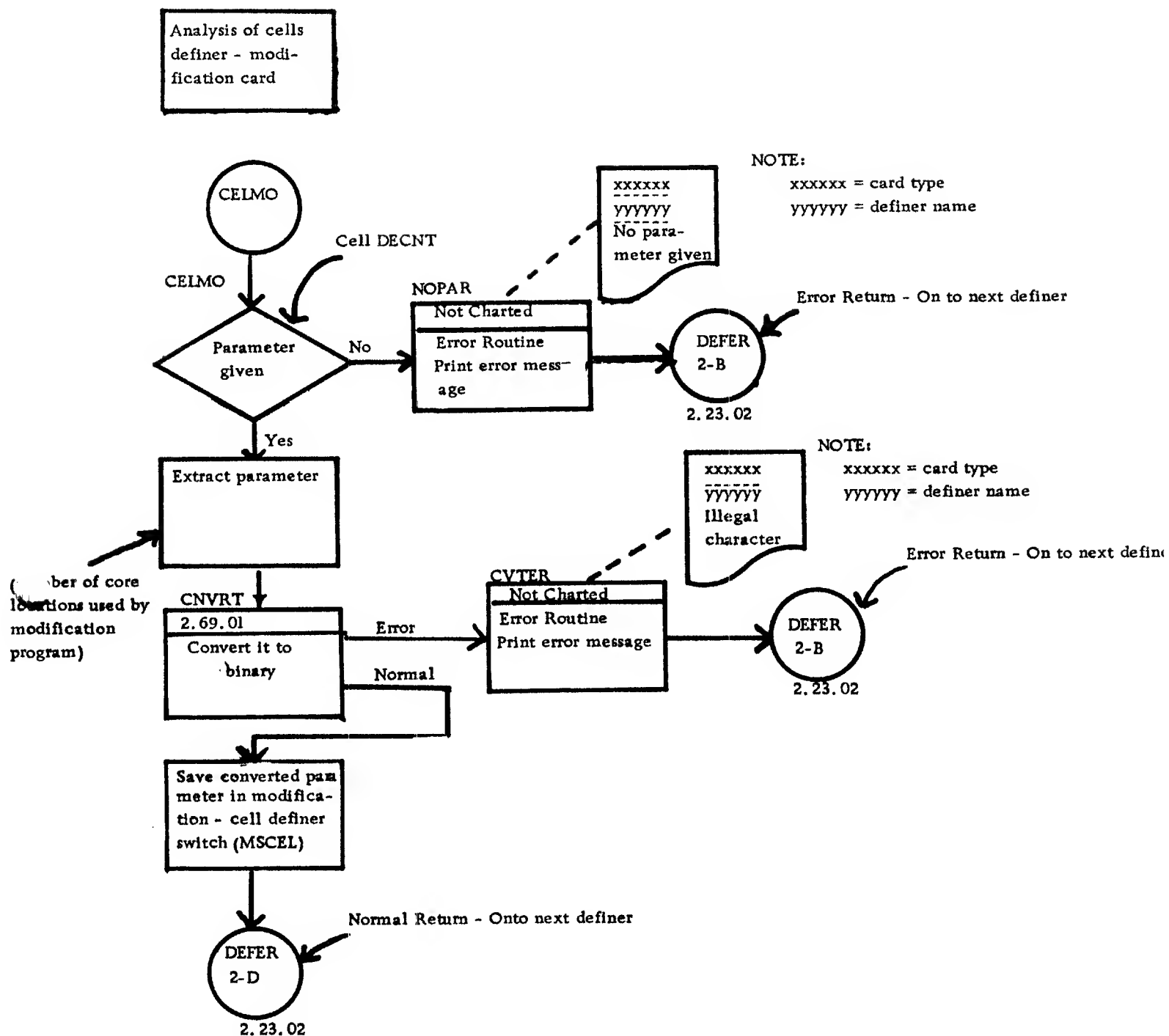


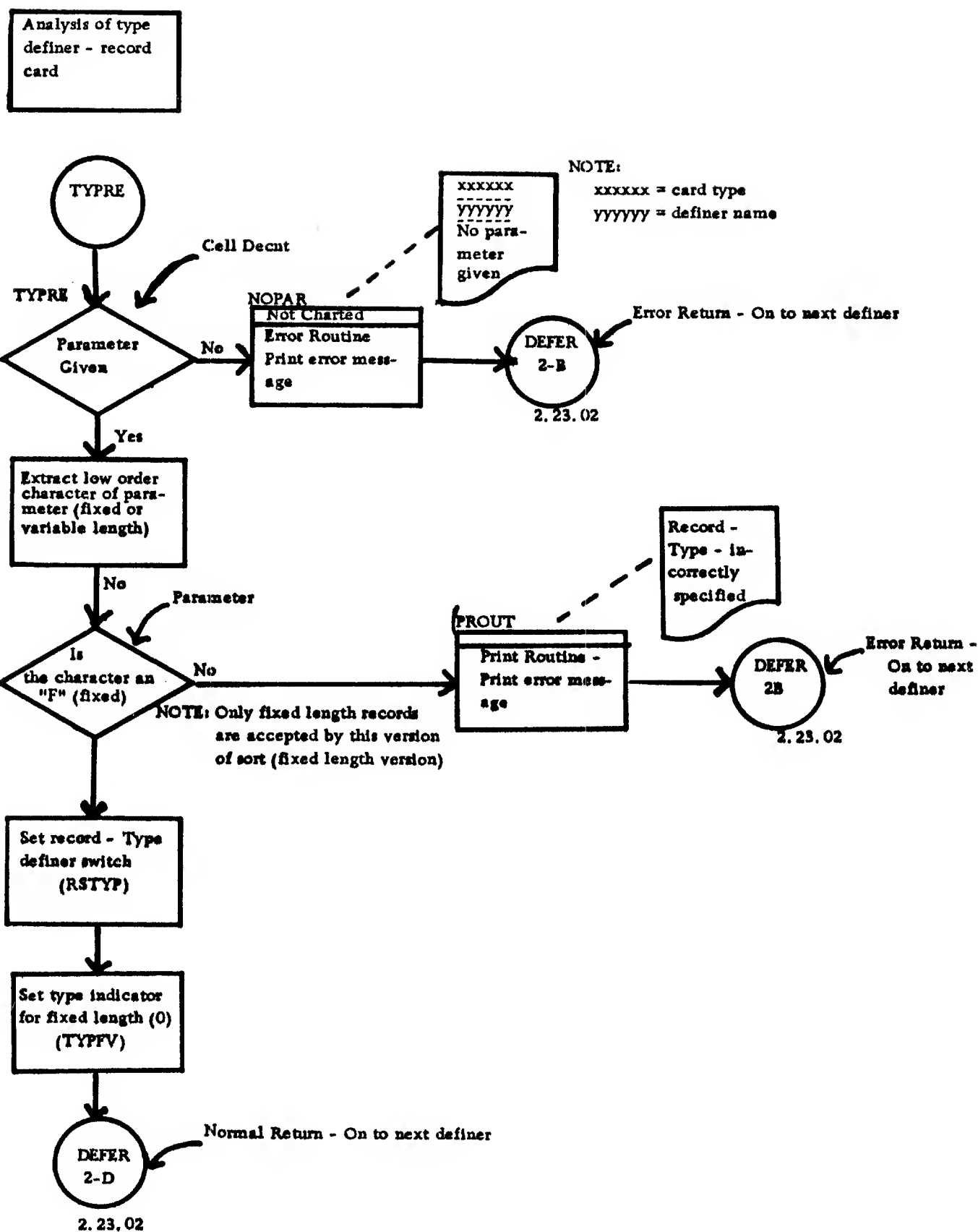




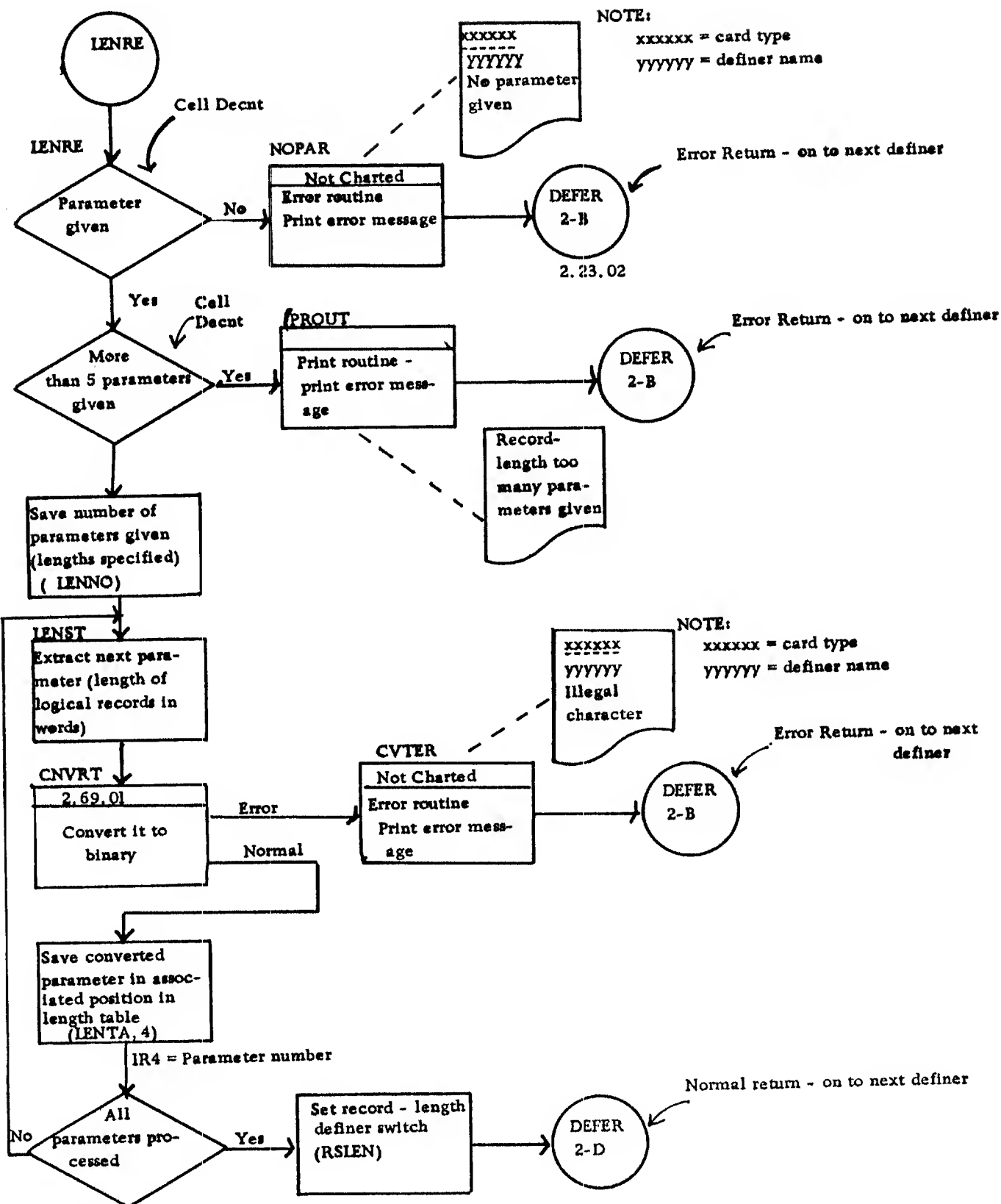




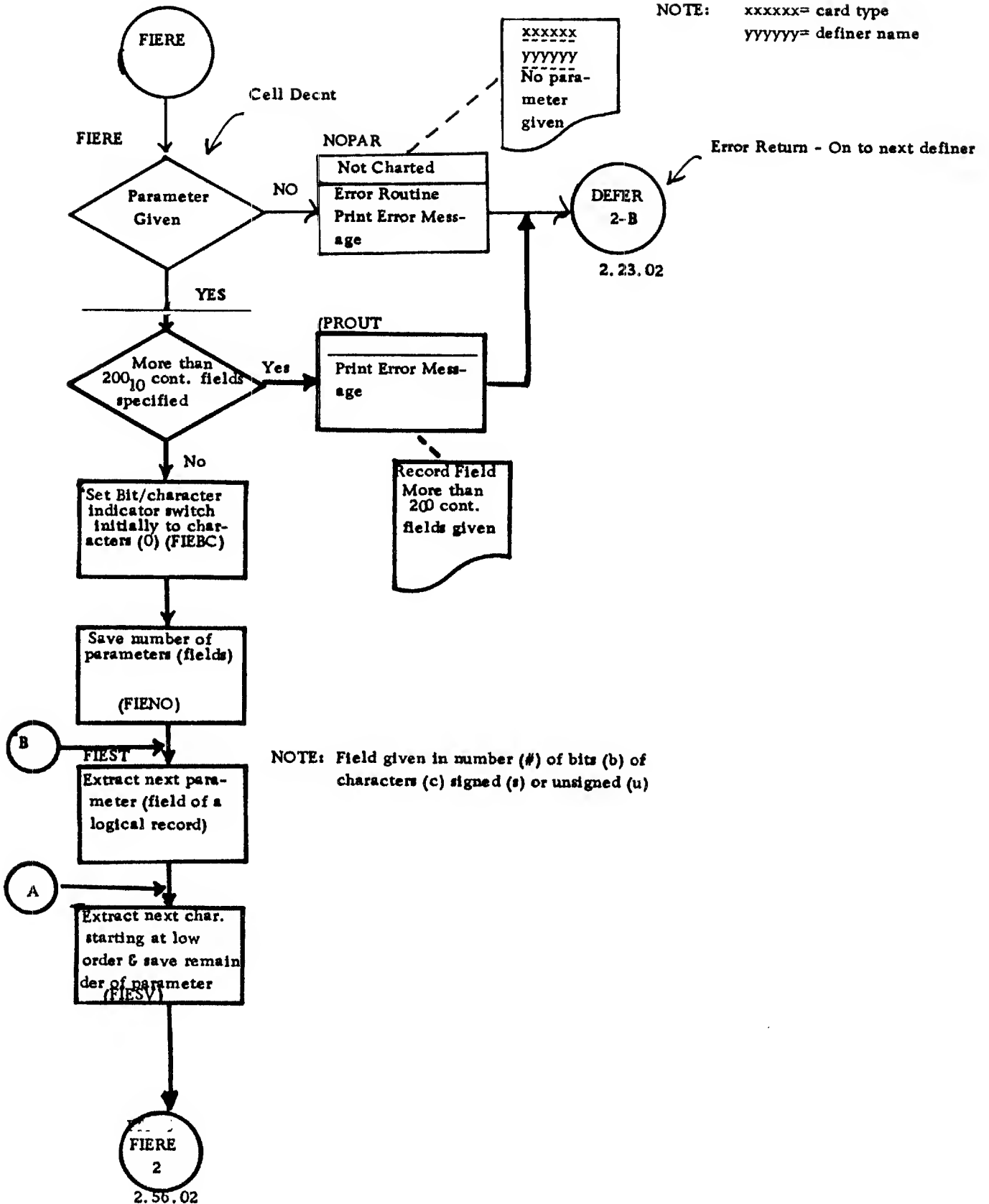




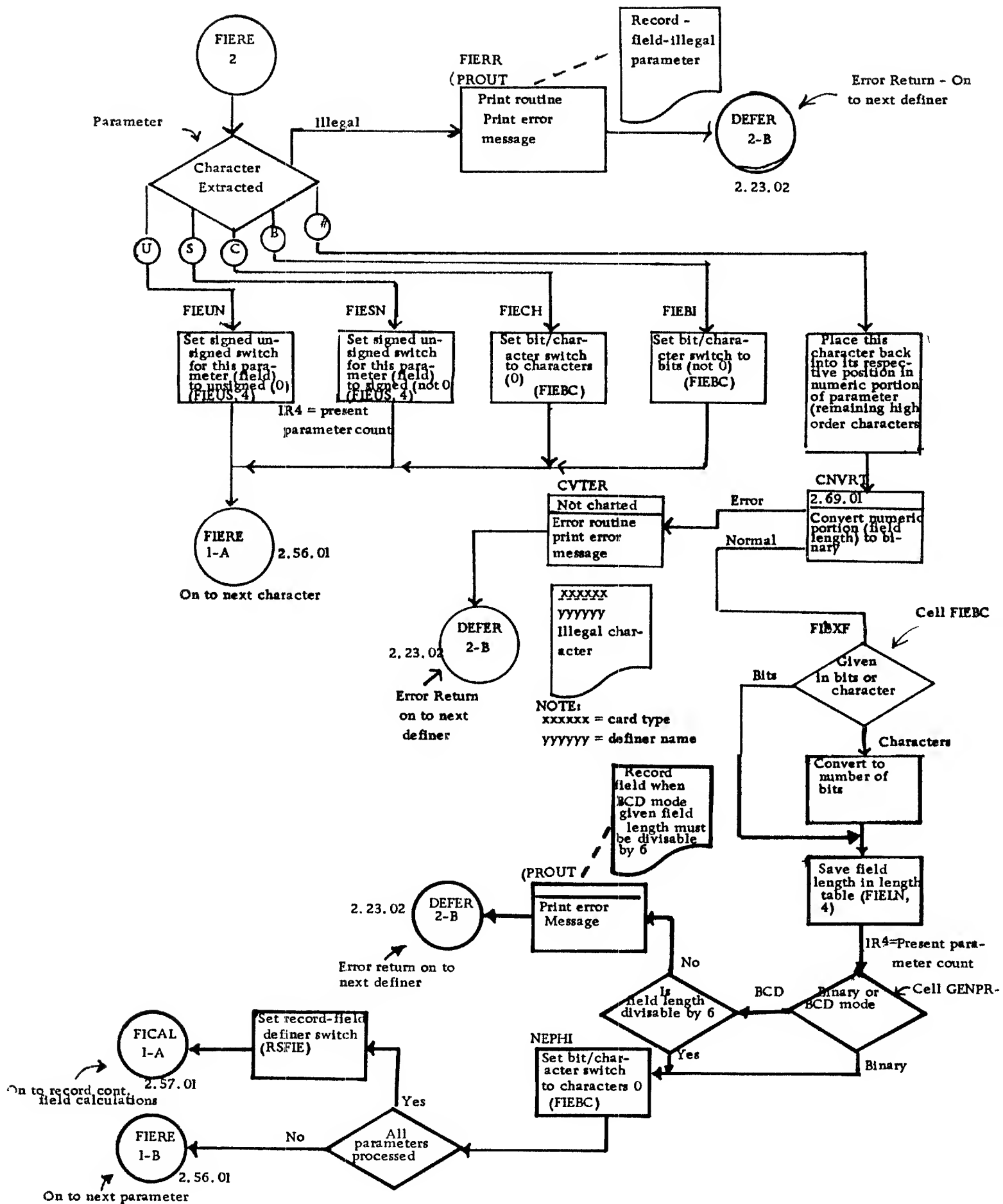
Analysis of length  
definer - record  
card

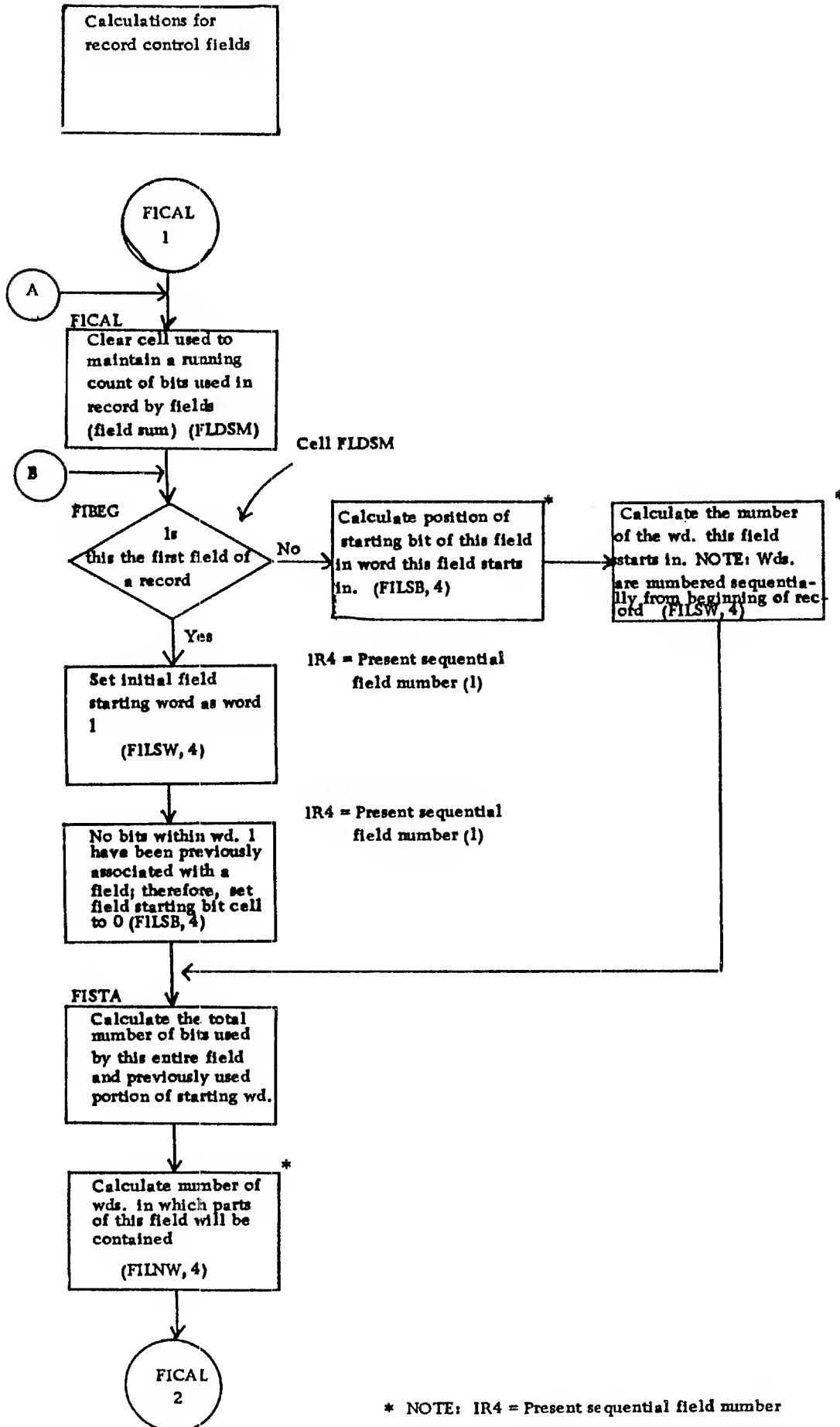


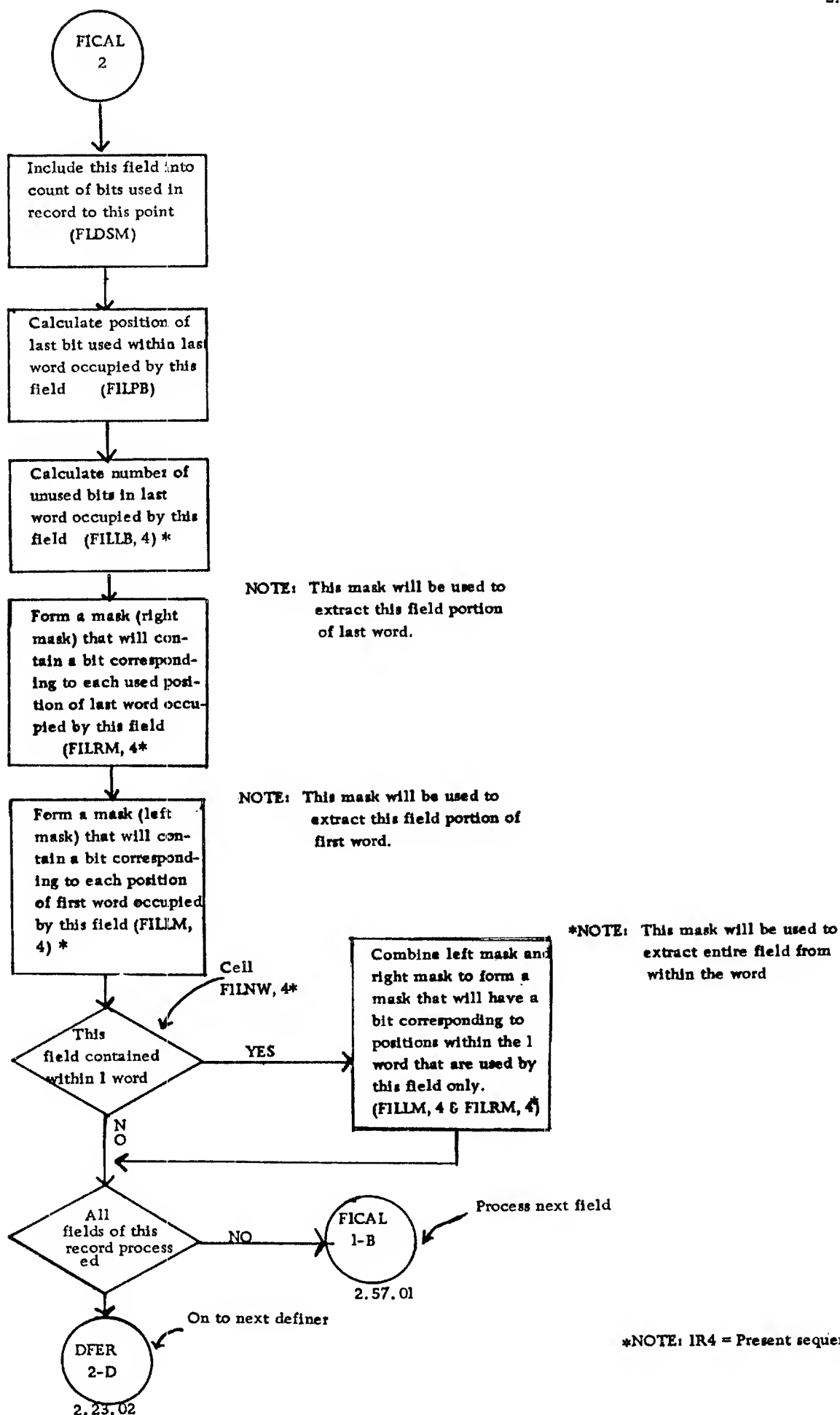
Analysis of field  
definer - record  
card





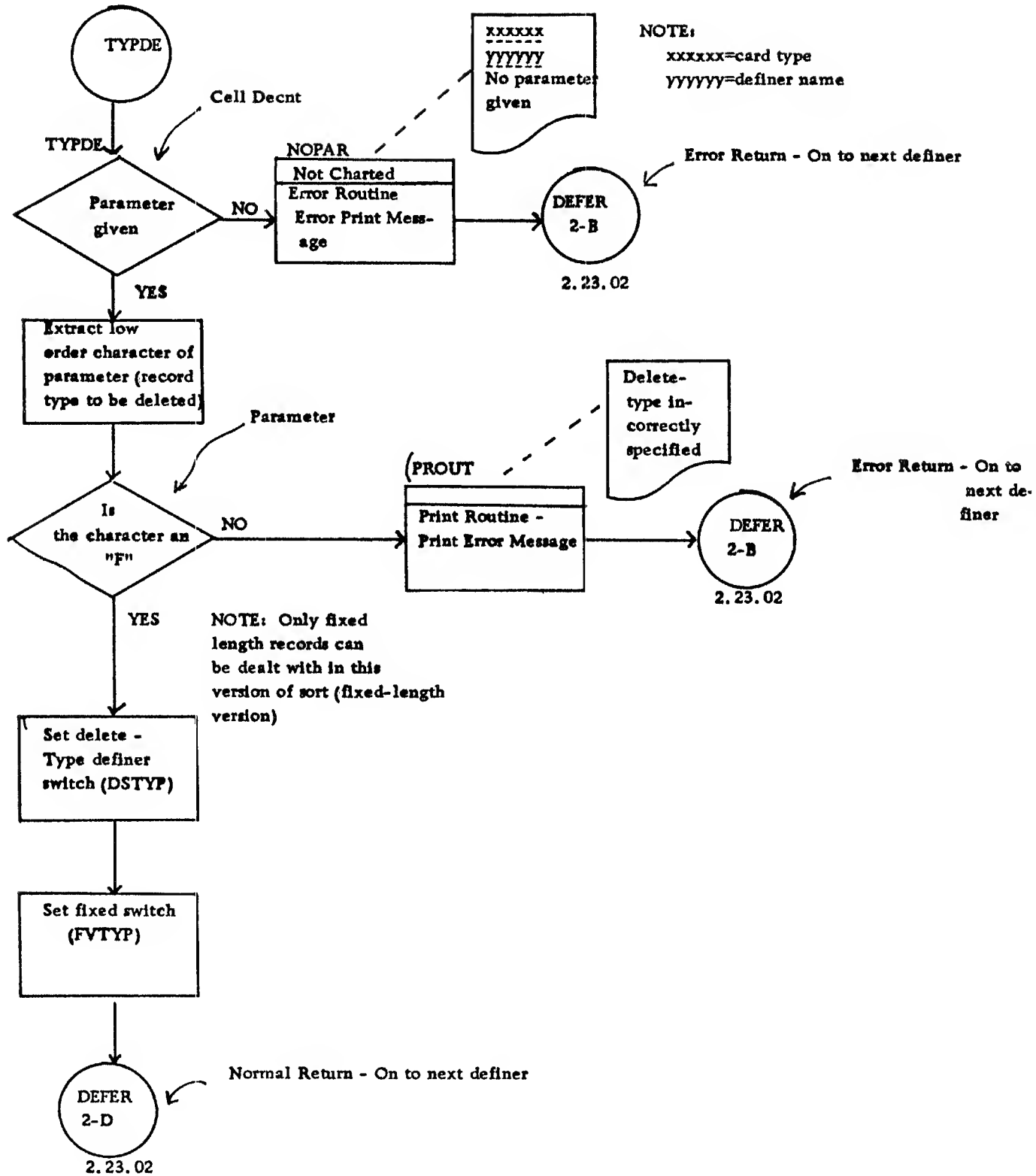


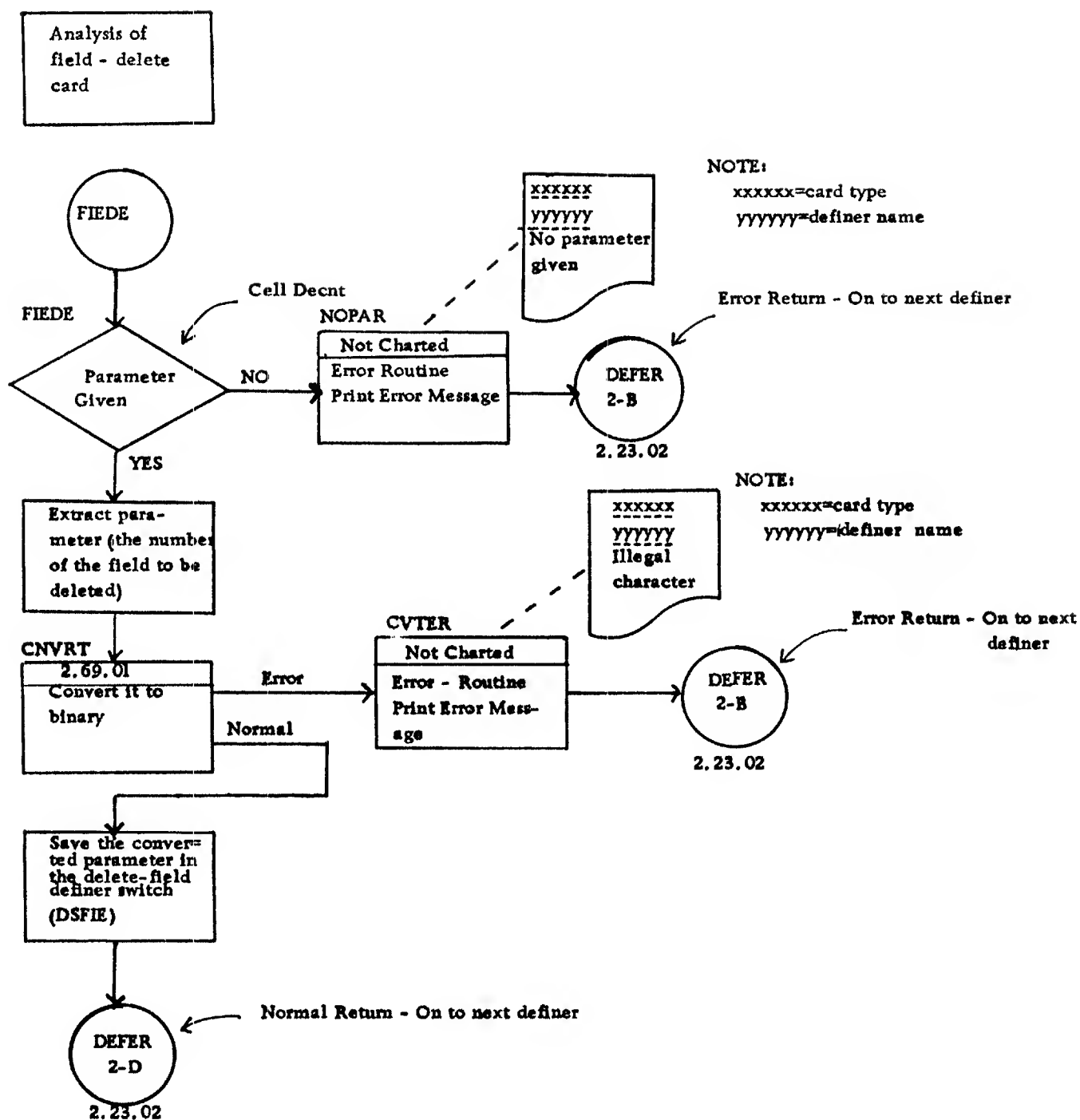




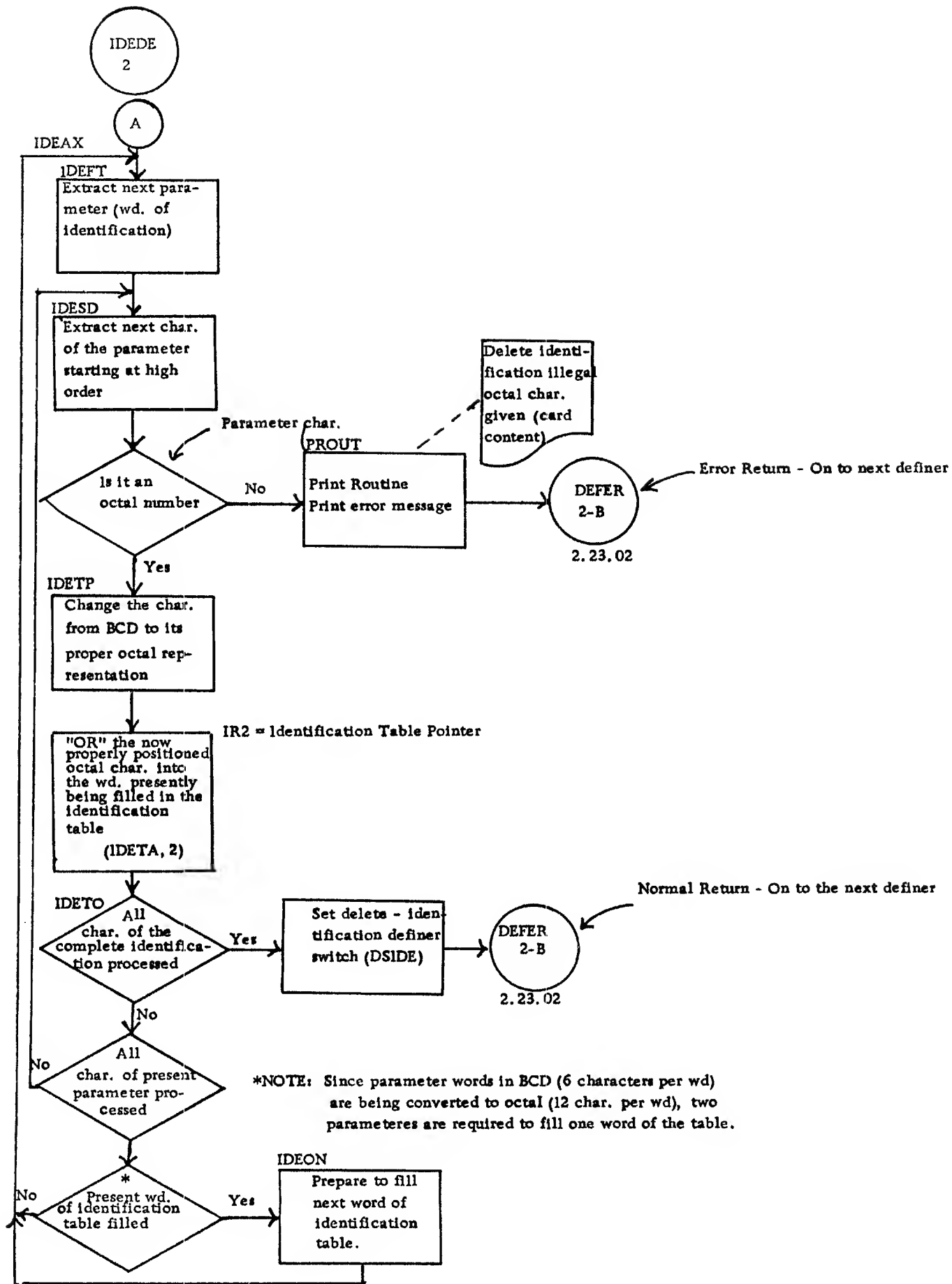
\*NOTE: IR4 = Present sequential field number

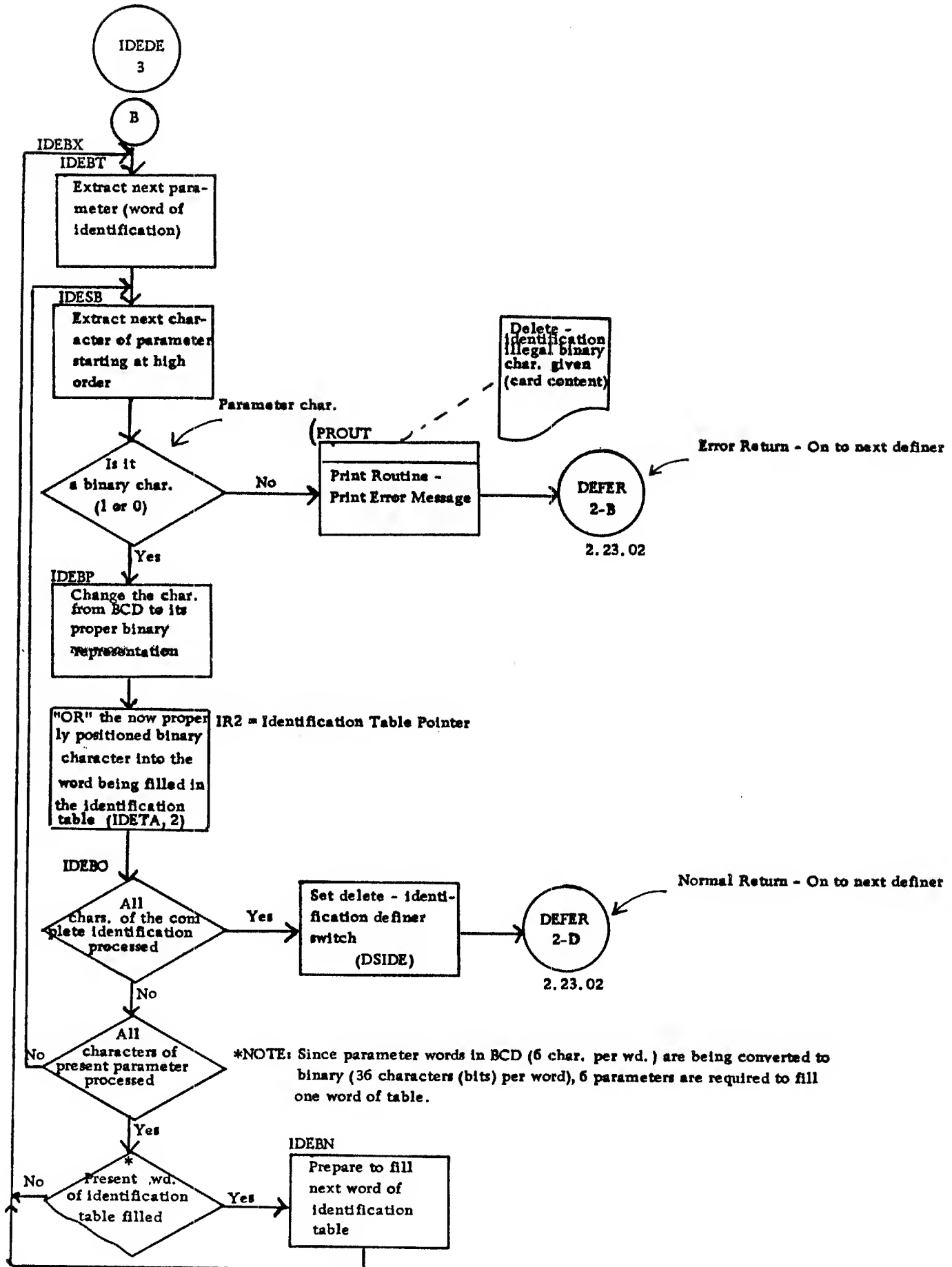
Analysis of  
type definer  
Delete Card



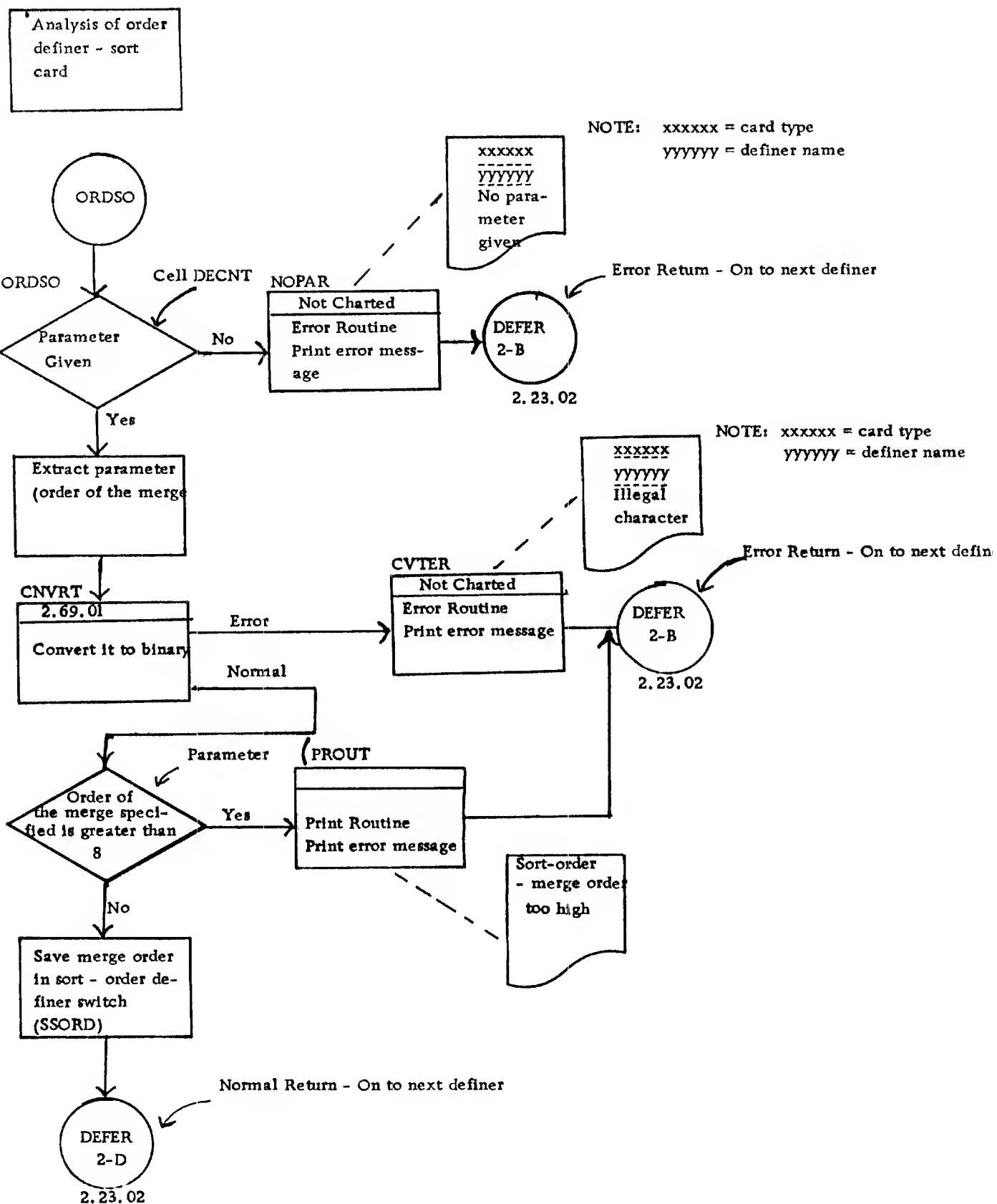


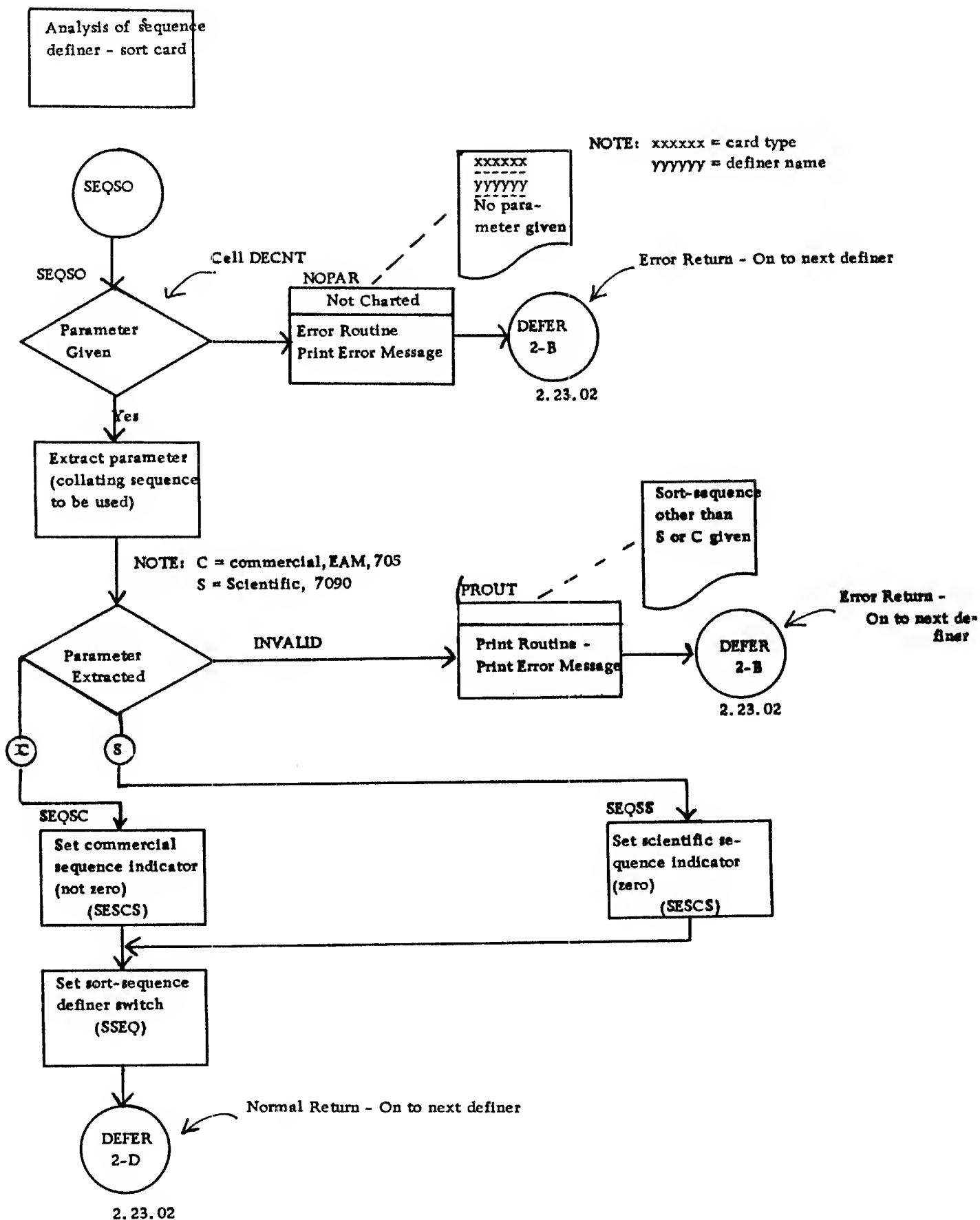


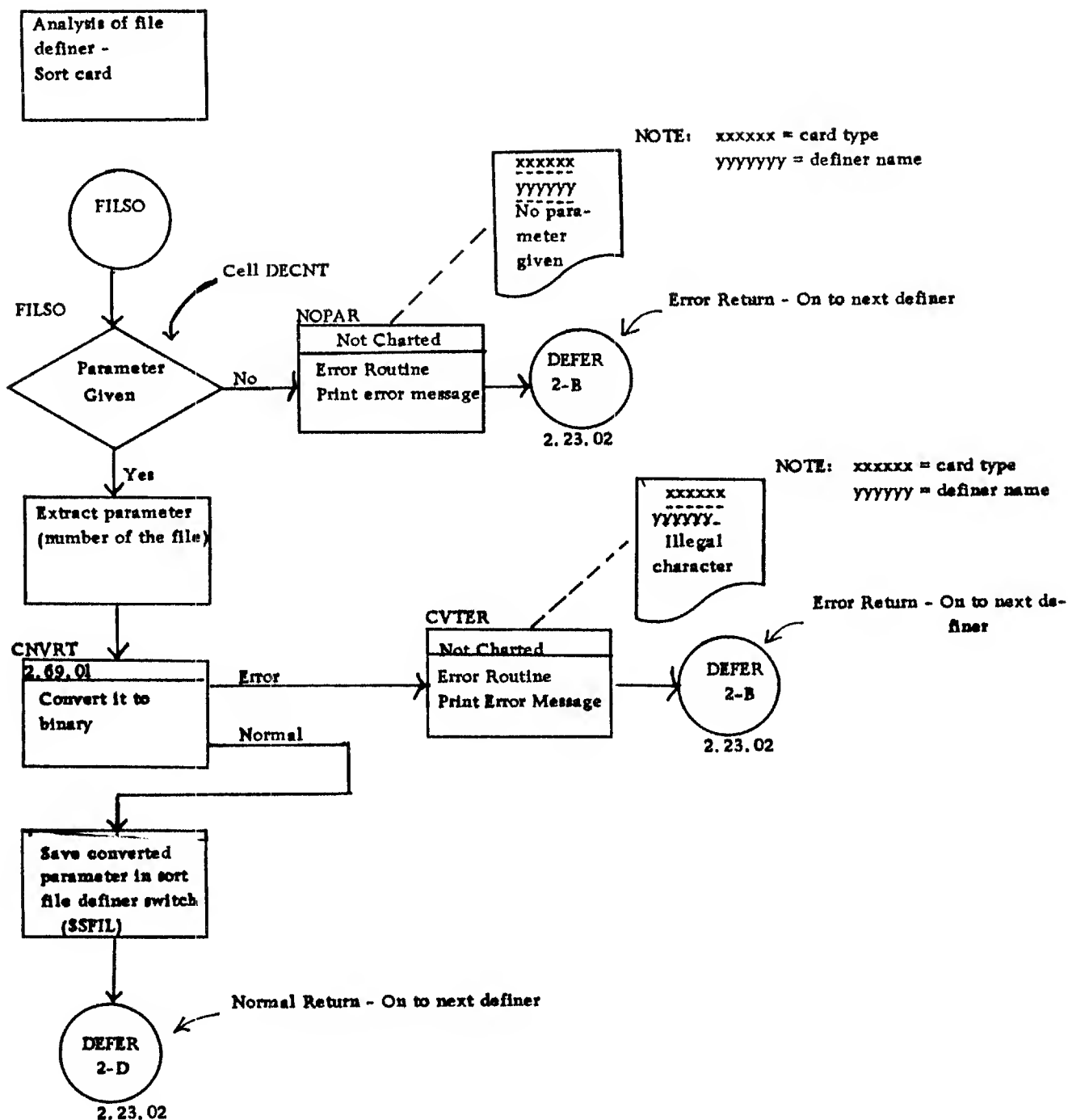


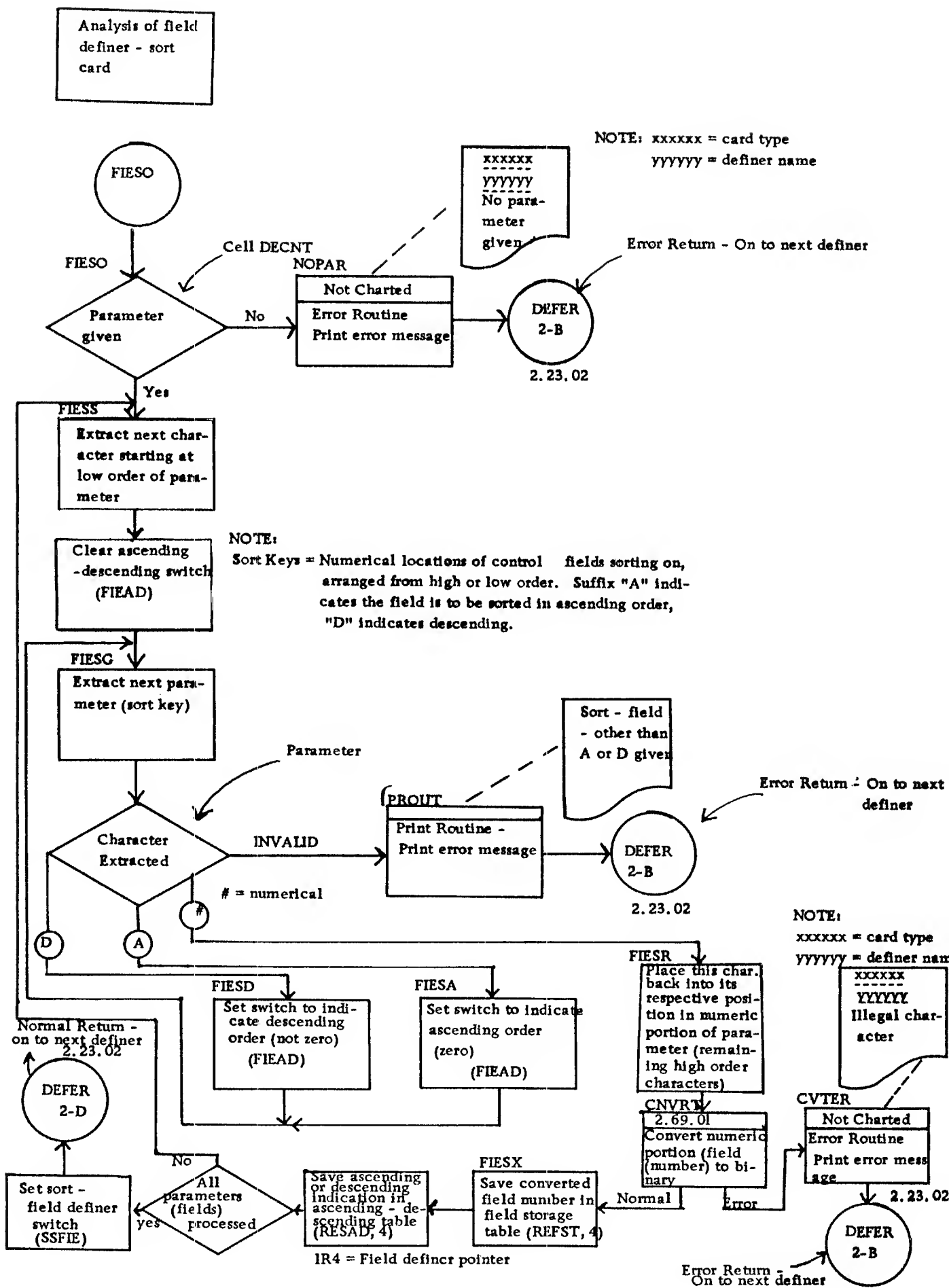


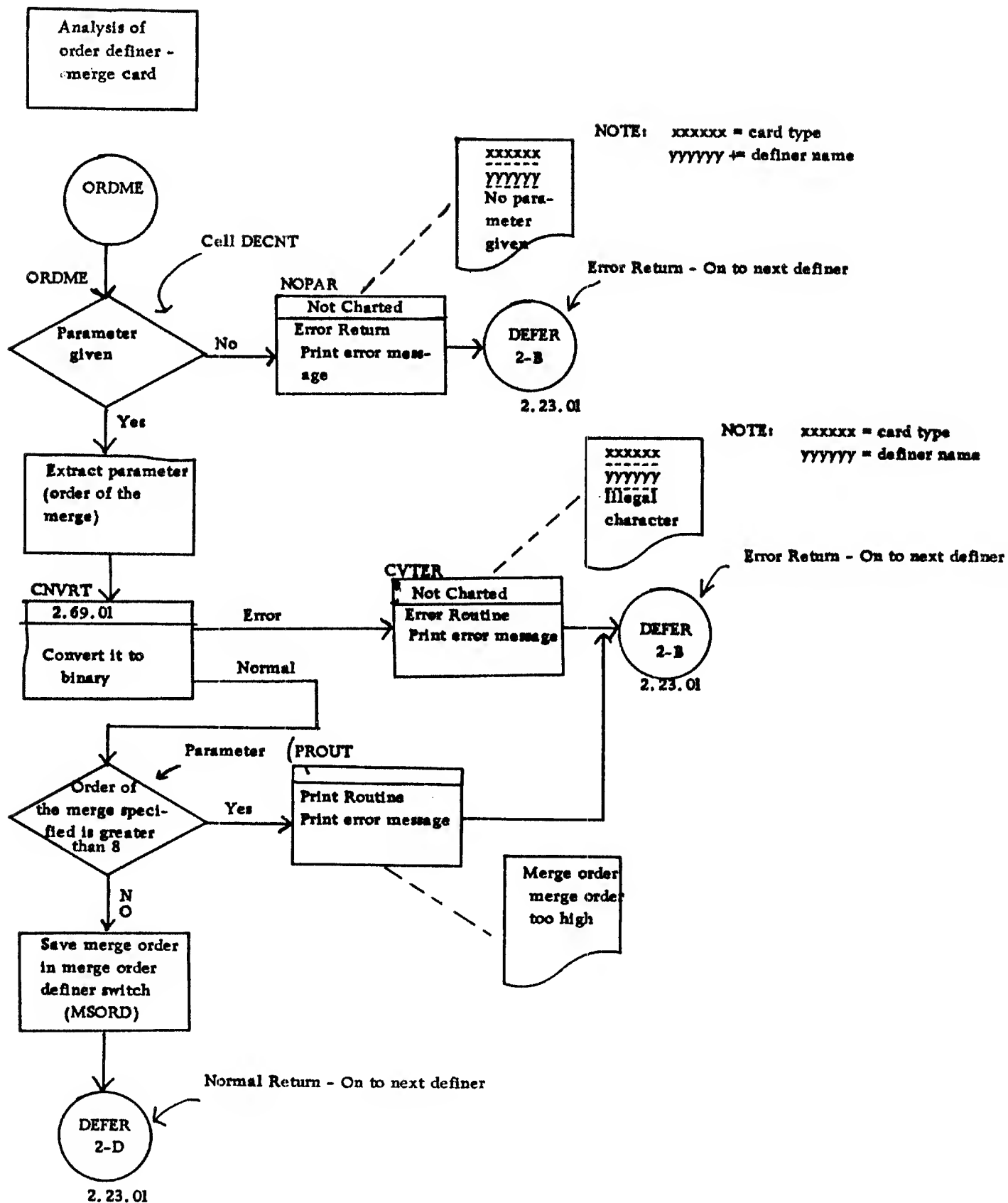




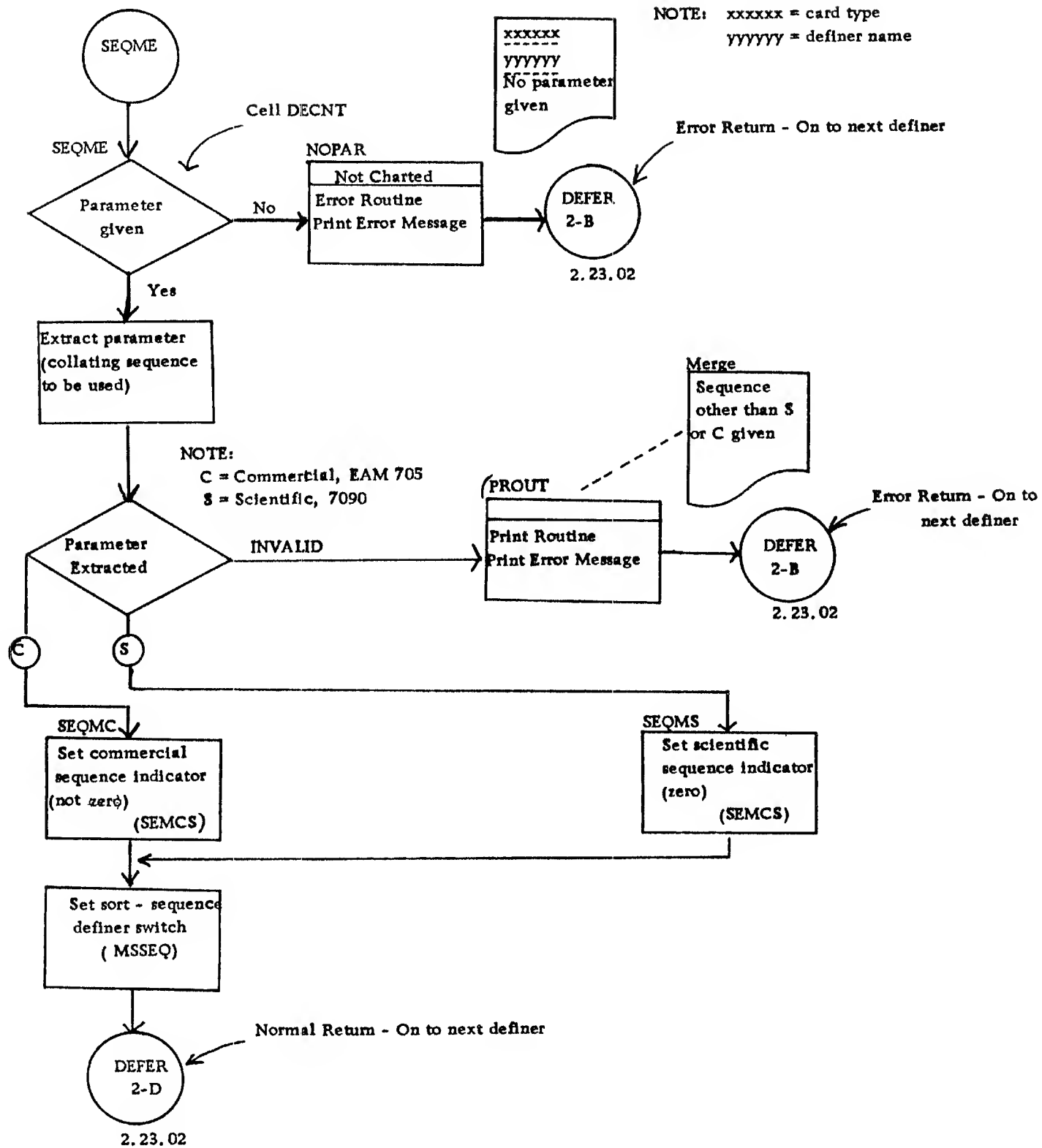




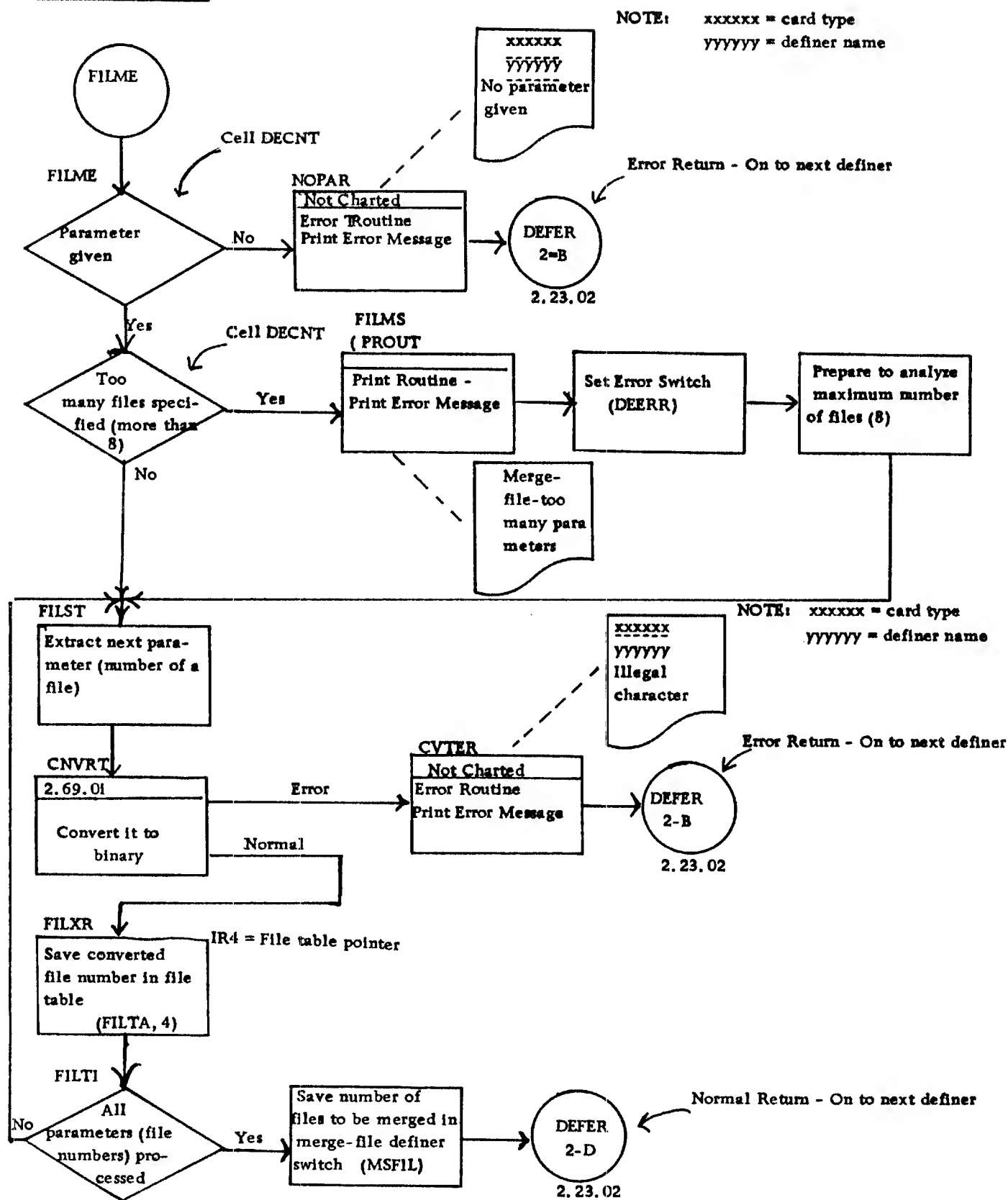


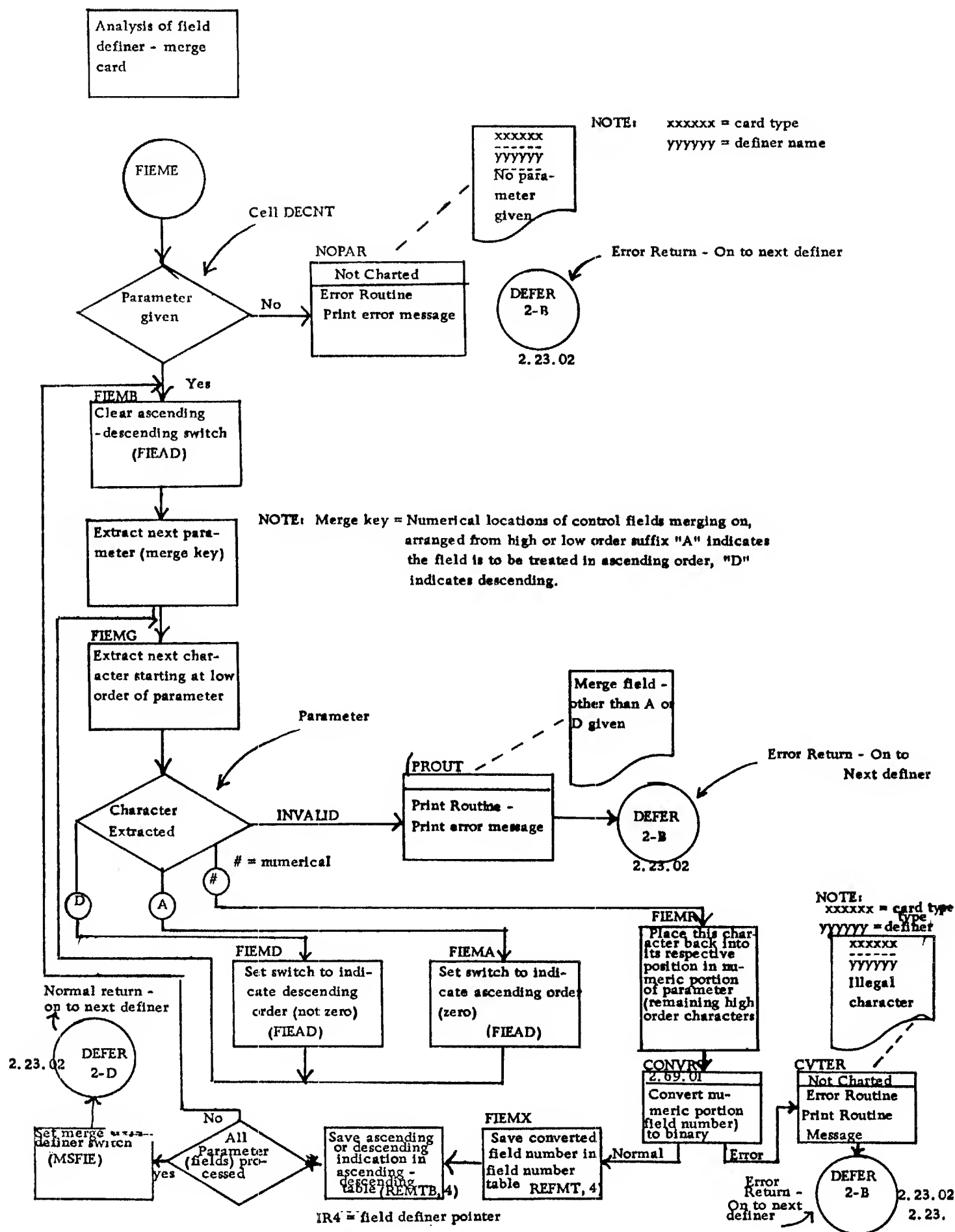


Analysis of  
sequence definer  
merge card

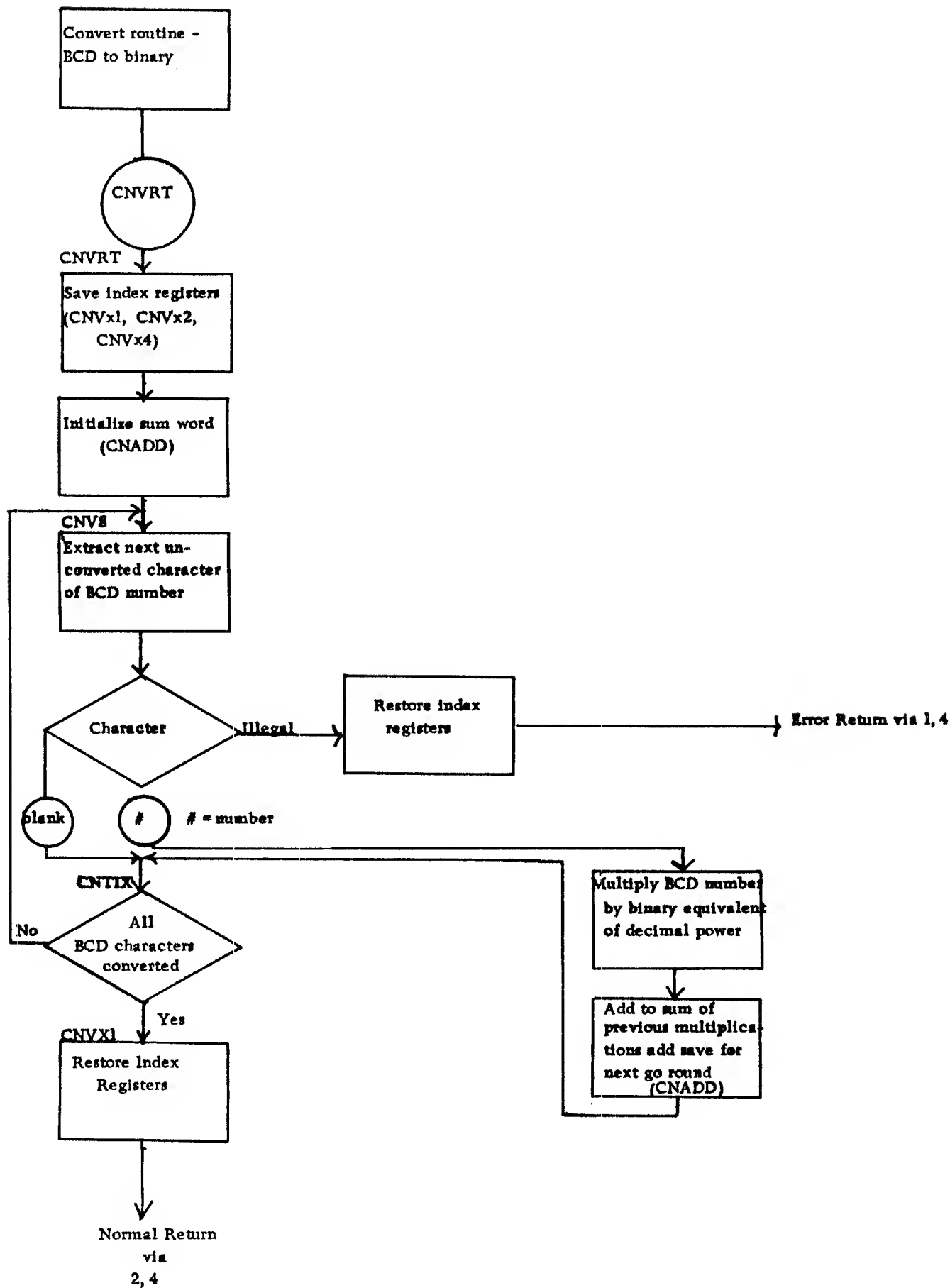


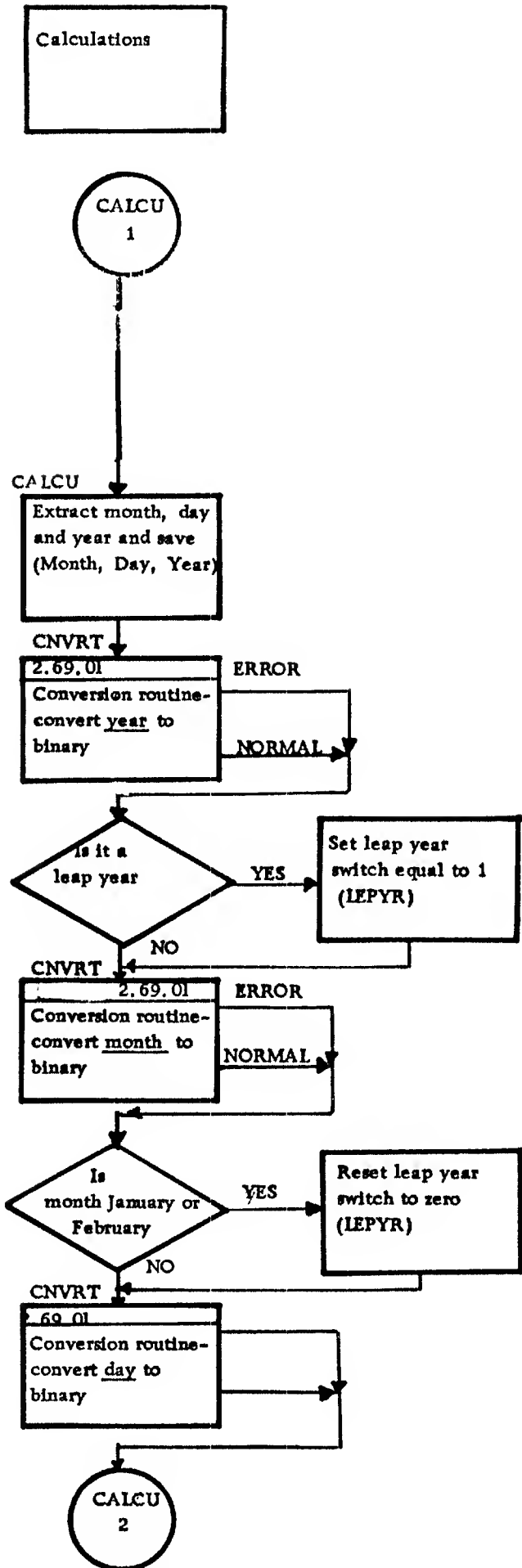
Analysis of file  
definer - merge  
card

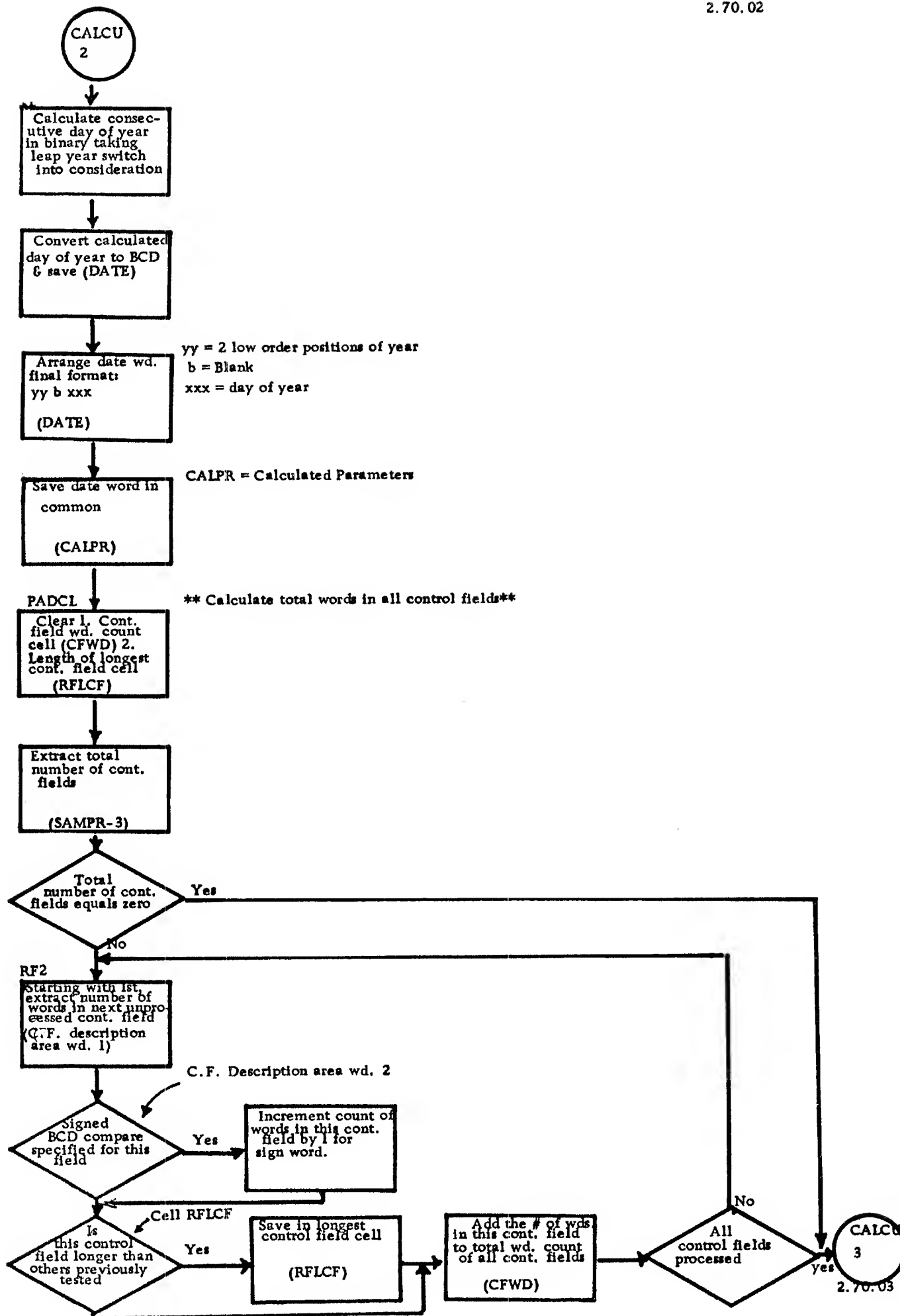


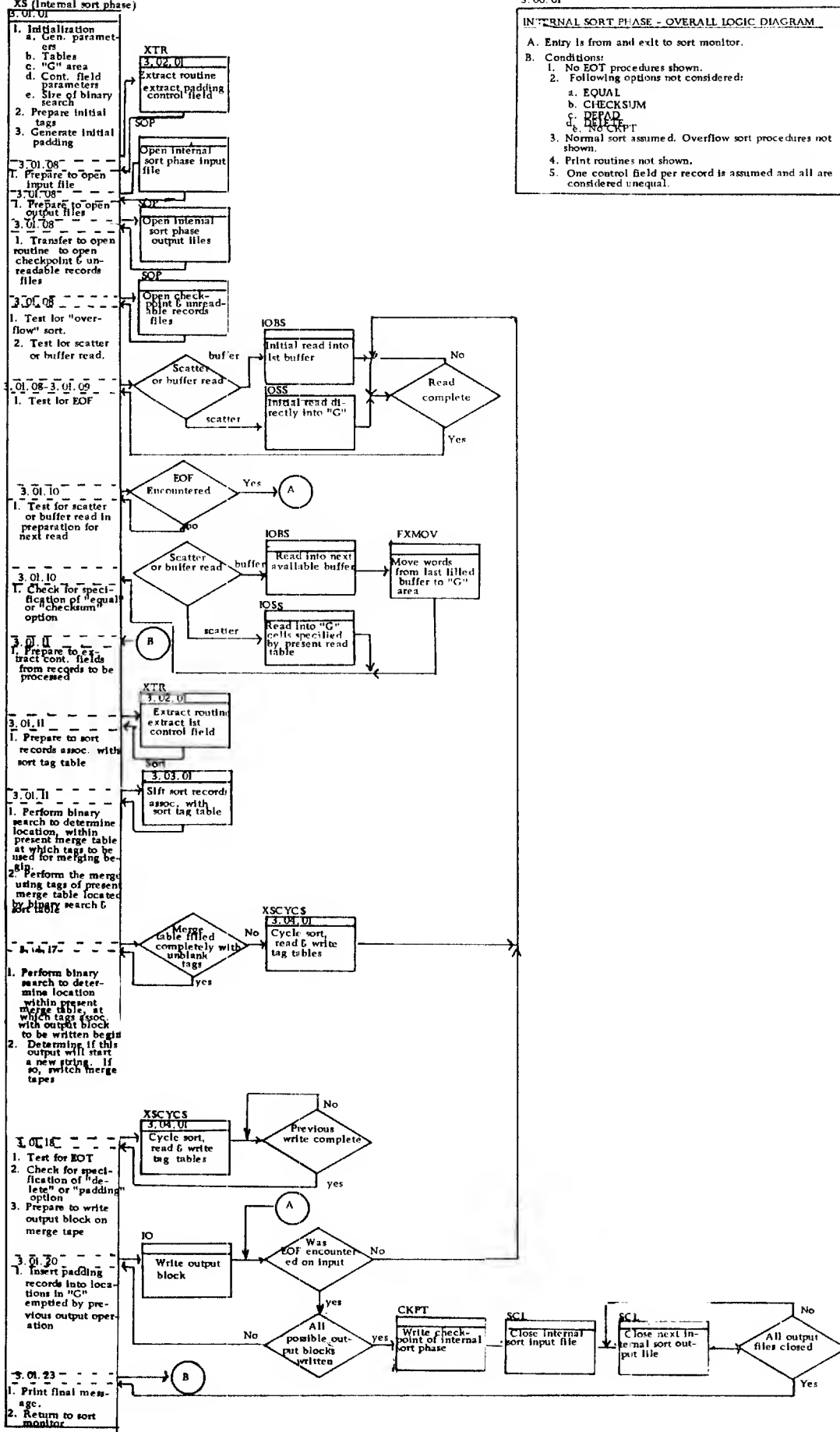












## INTERNAL SORT PHASE - OVERALL LOGIC DIAGRAM

A. Entry is from and exit to sort monitor.

B. Conditions:

1. No EOT procedures shown.

2. Following options not considered:

a. EQUAL

b. CHECKSUM

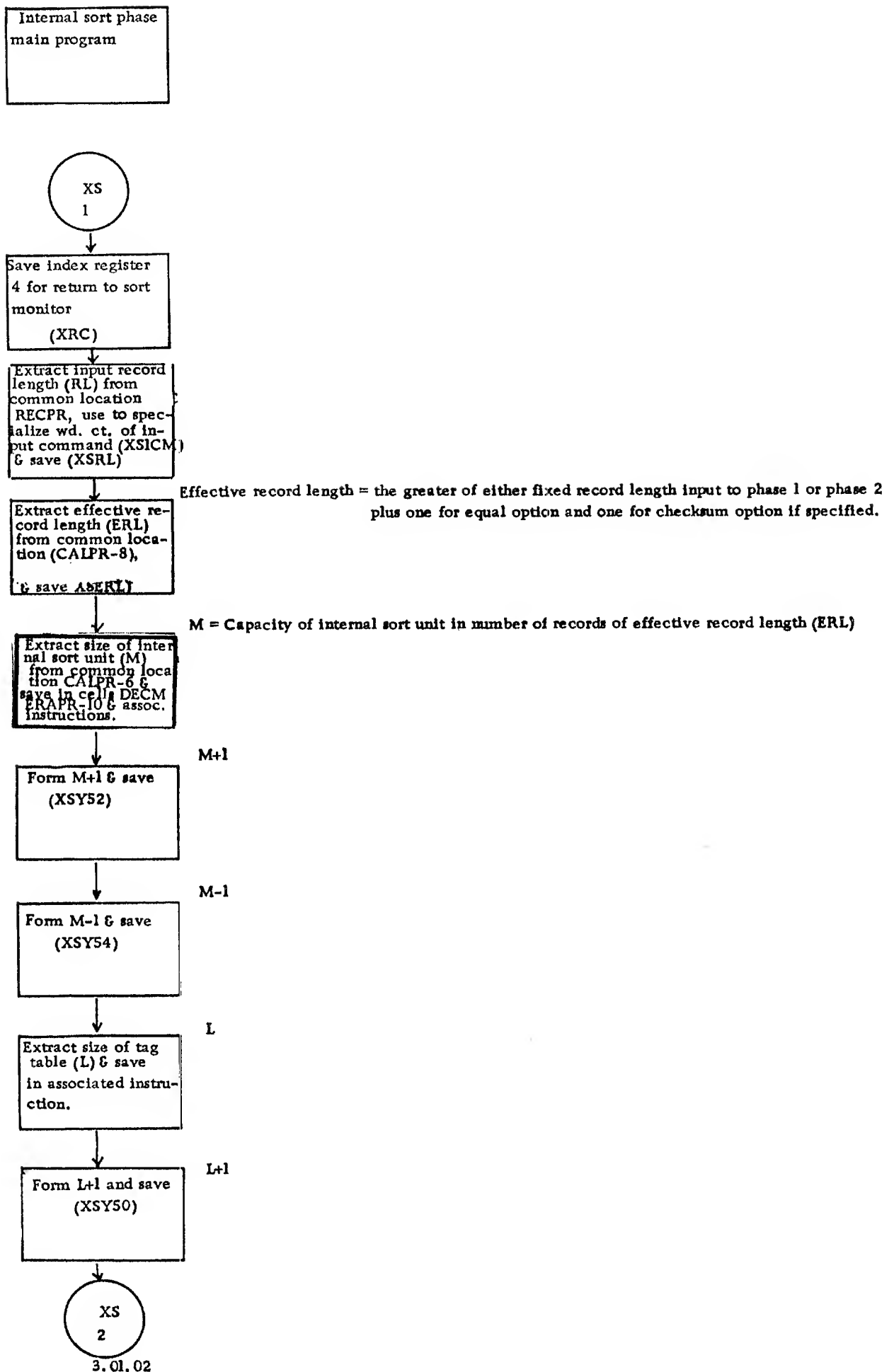
c. DEPAD

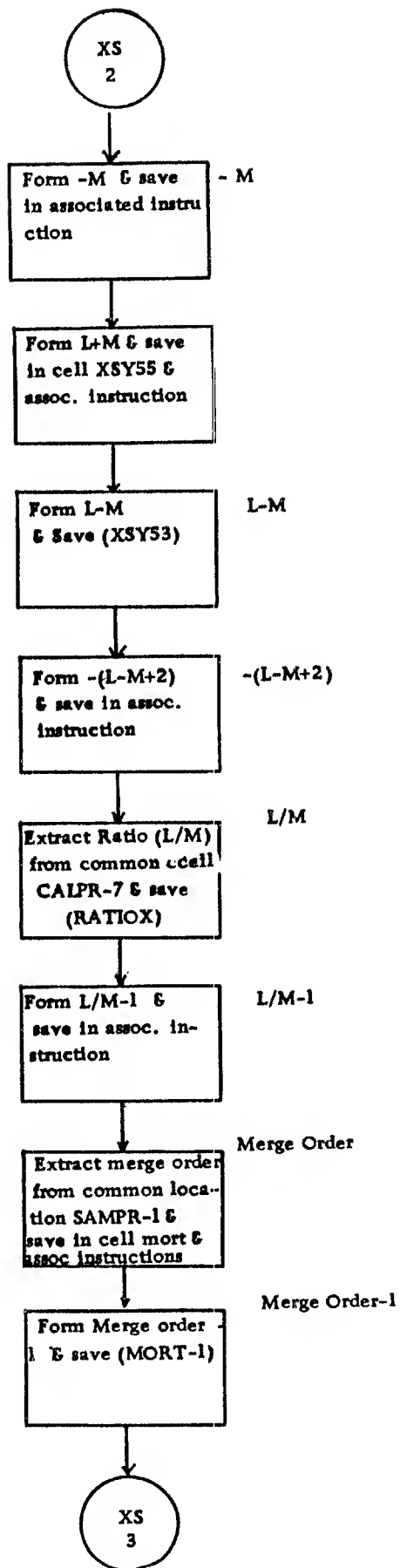
d. NO CKPT

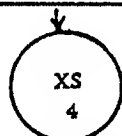
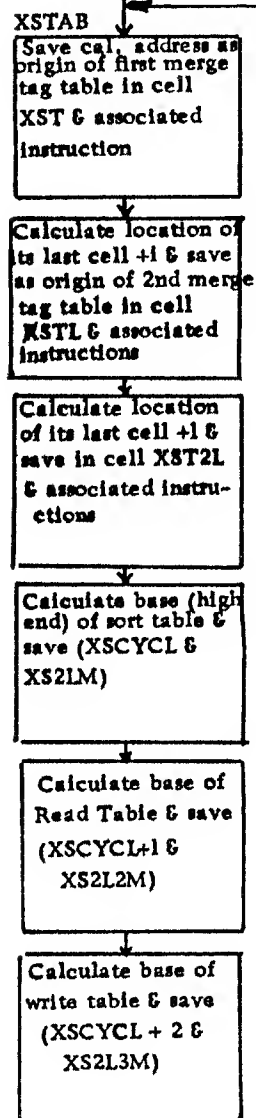
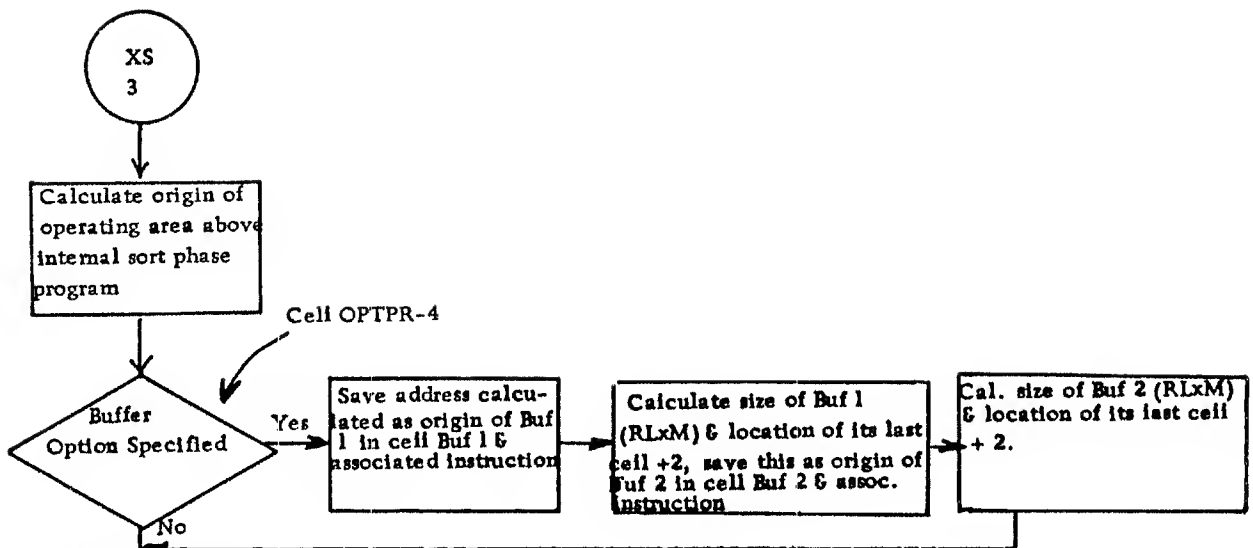
3. Normal sort assumed. Overflow sort procedures not shown.

4. Print routines not shown.

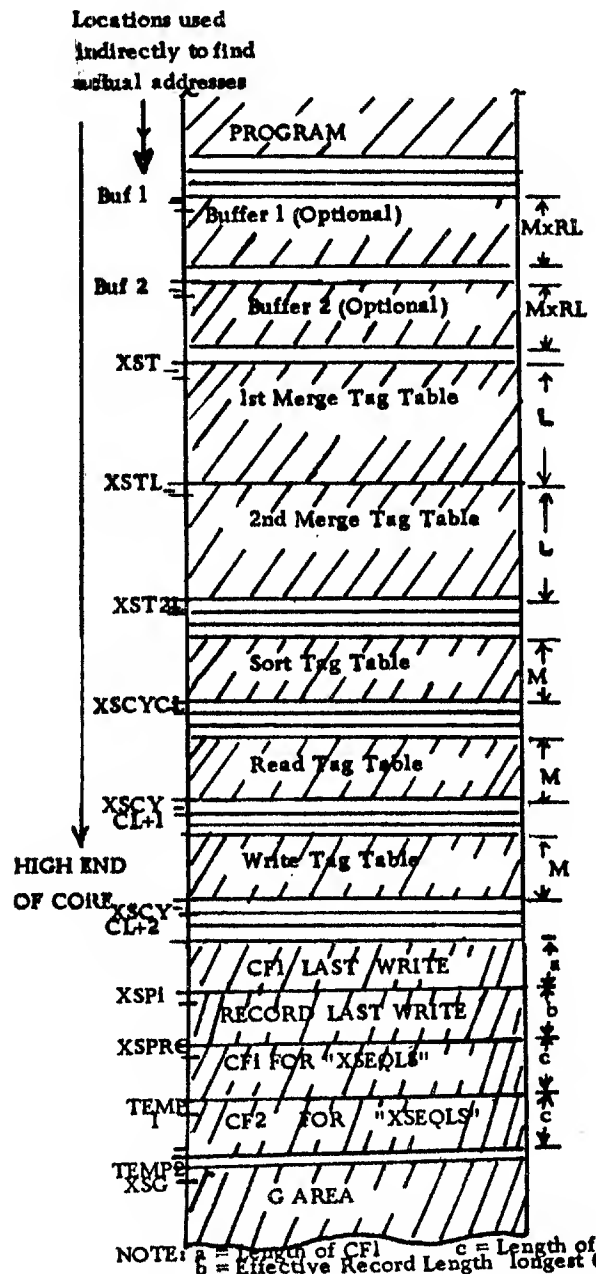
5. One control field per record is assumed and all are considered unequal.

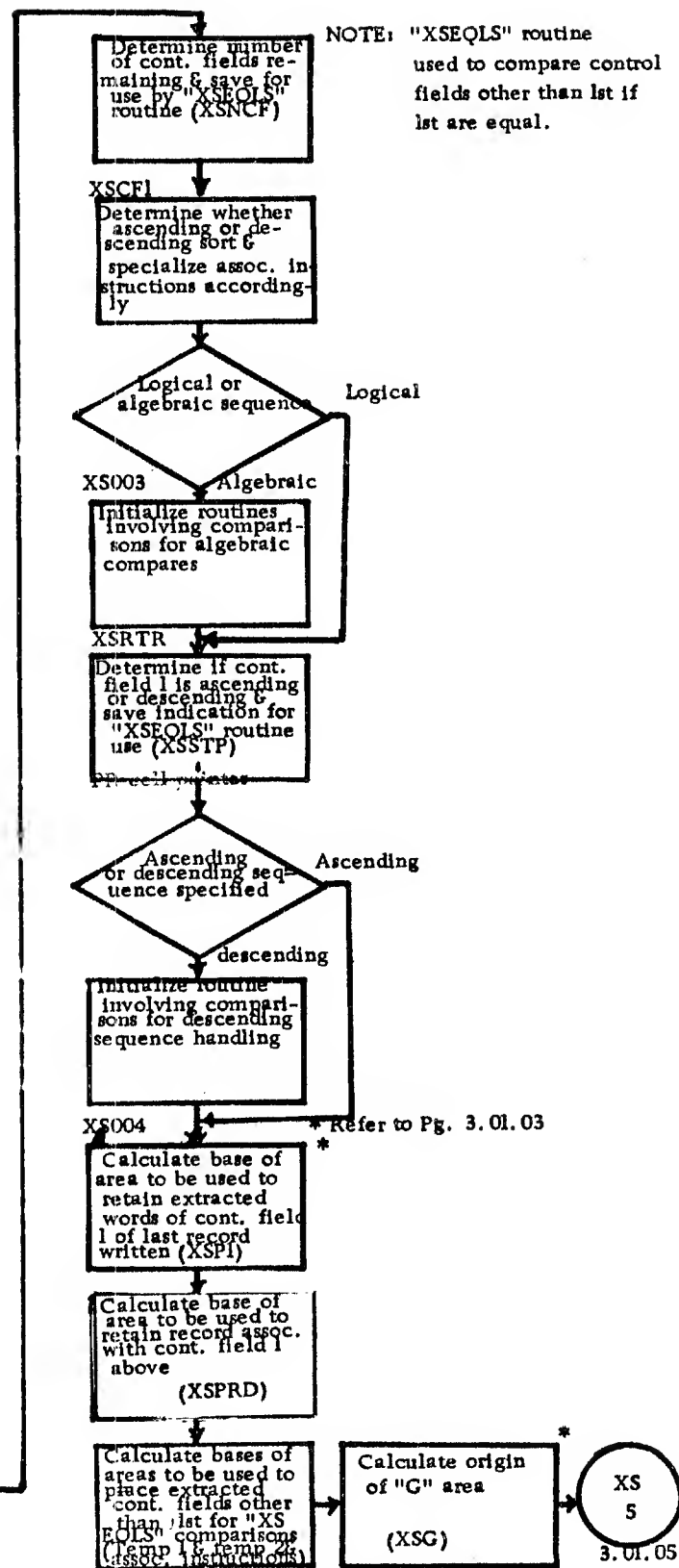
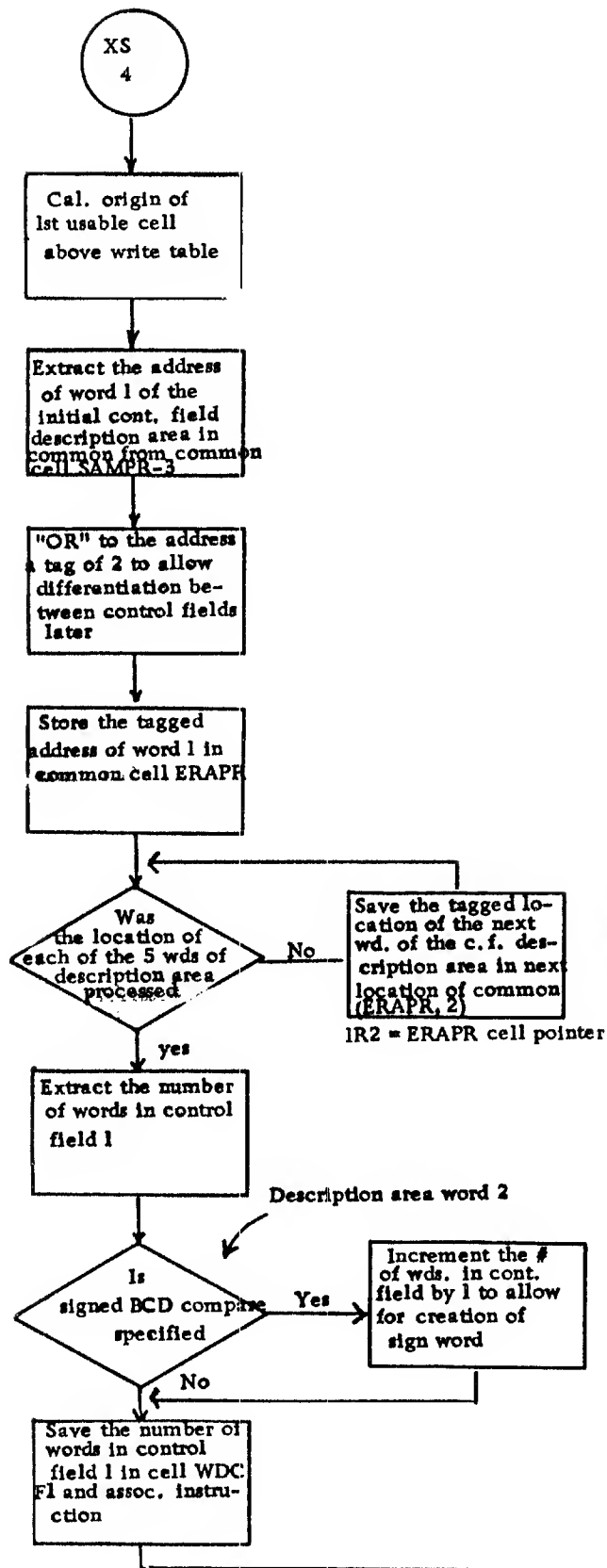




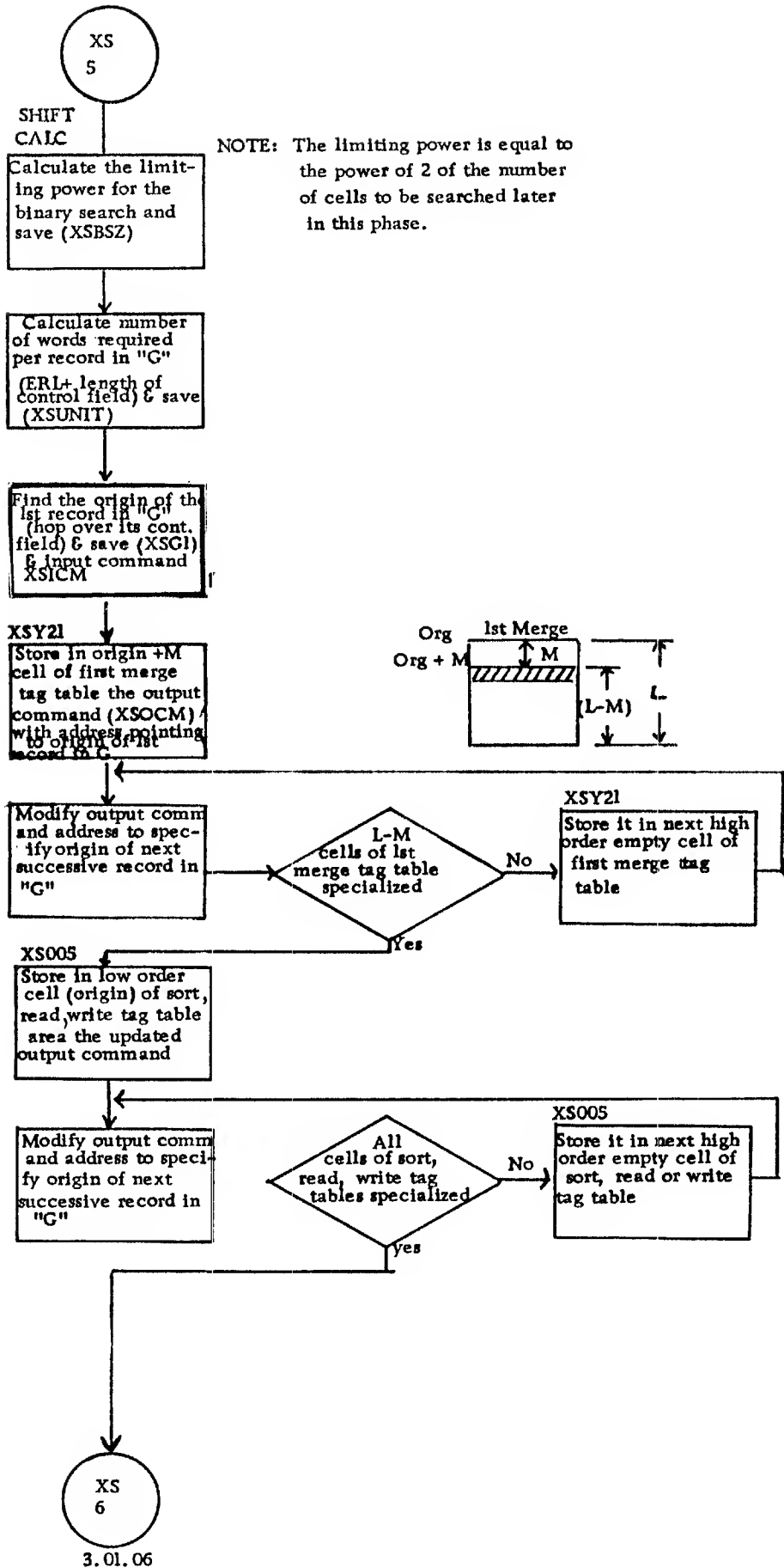


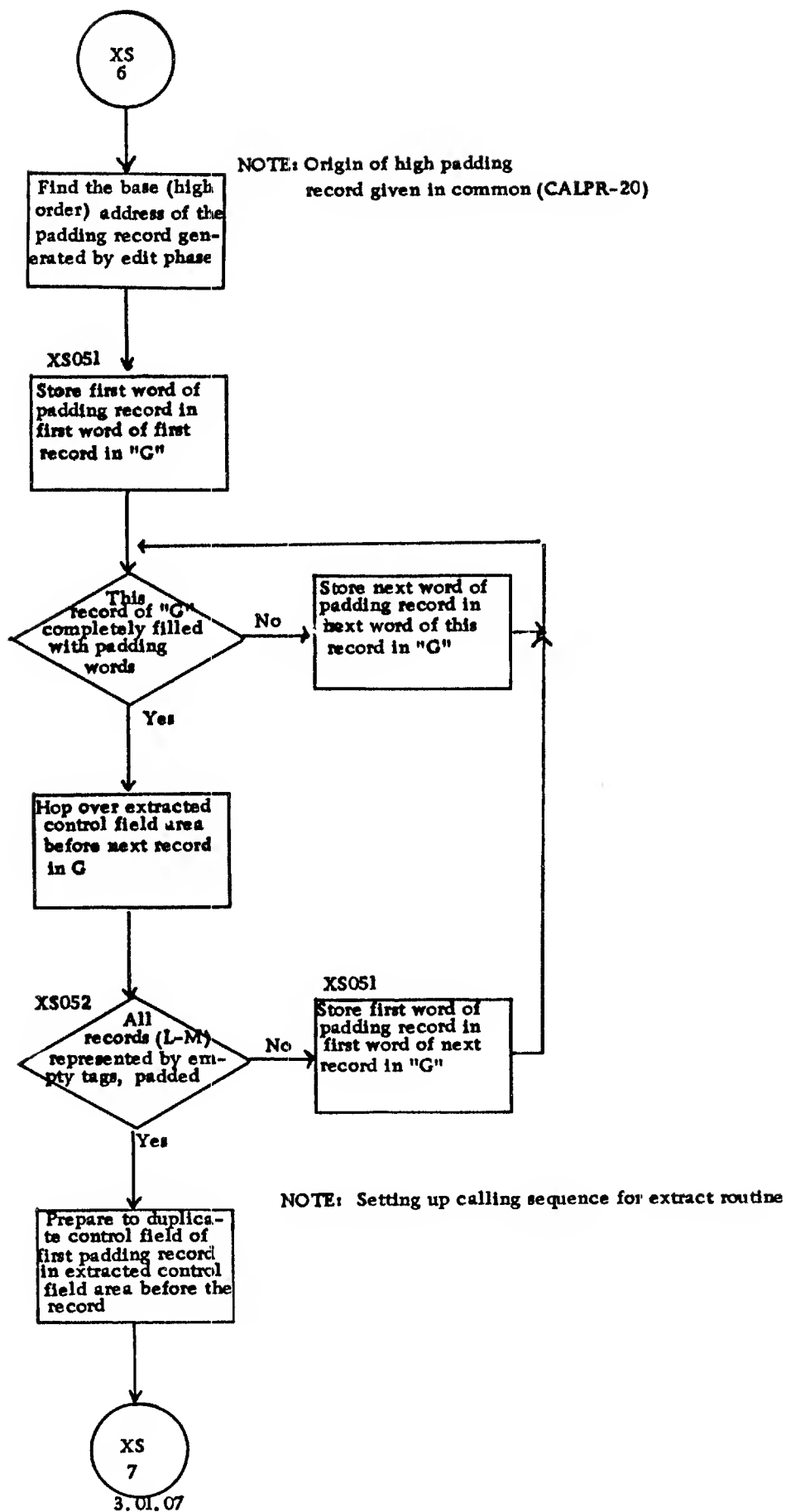
3. 01. 04

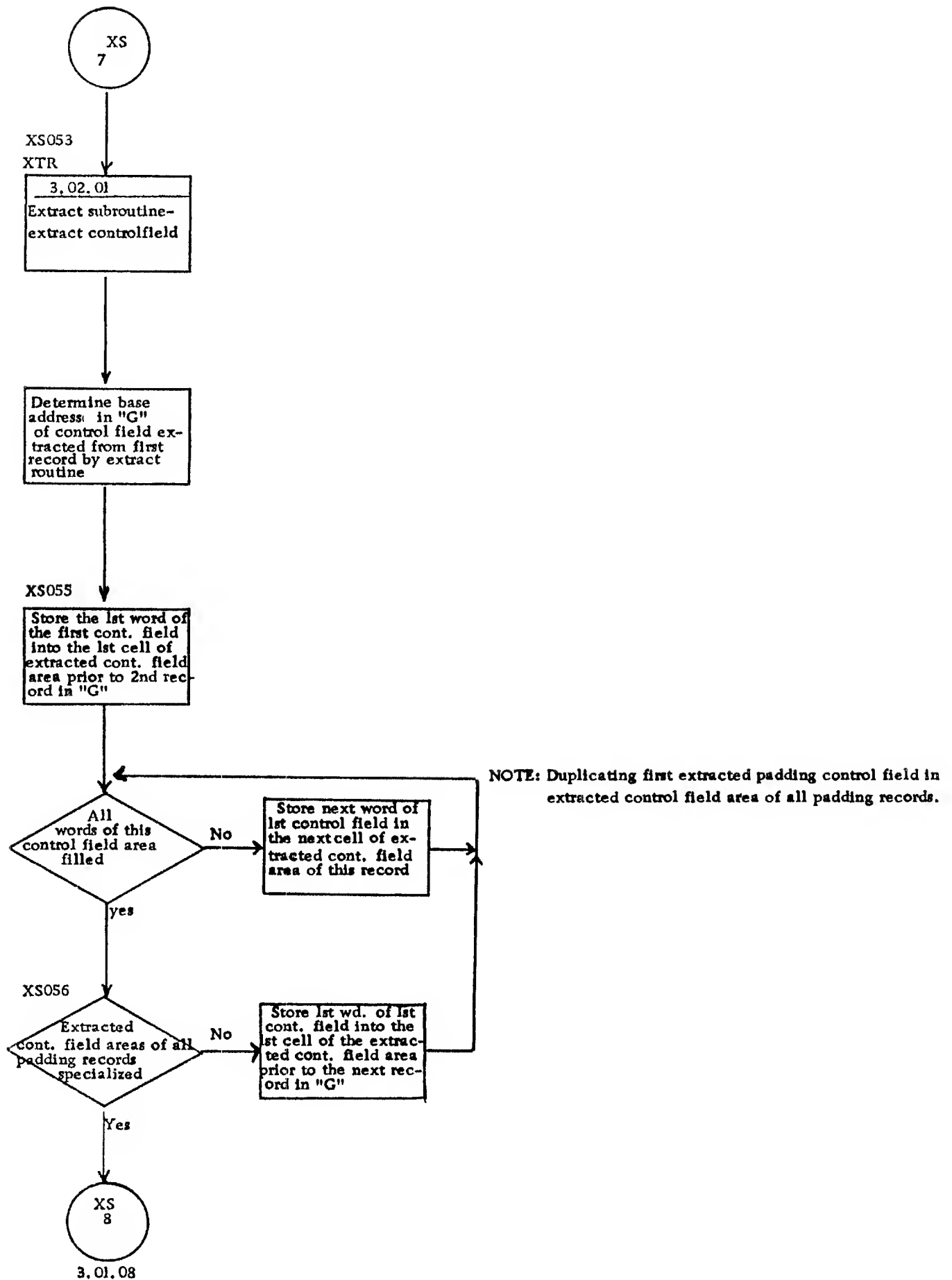


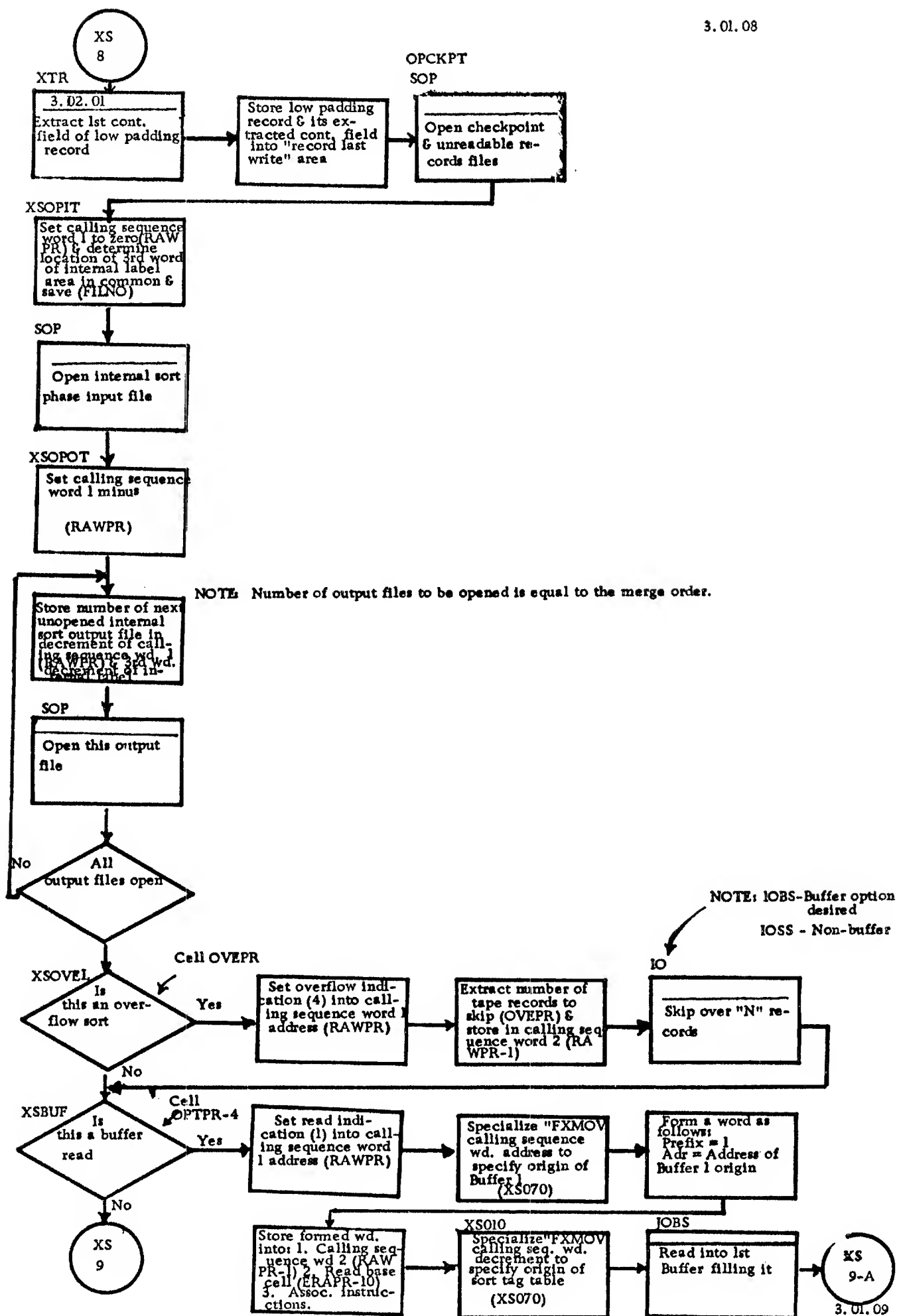


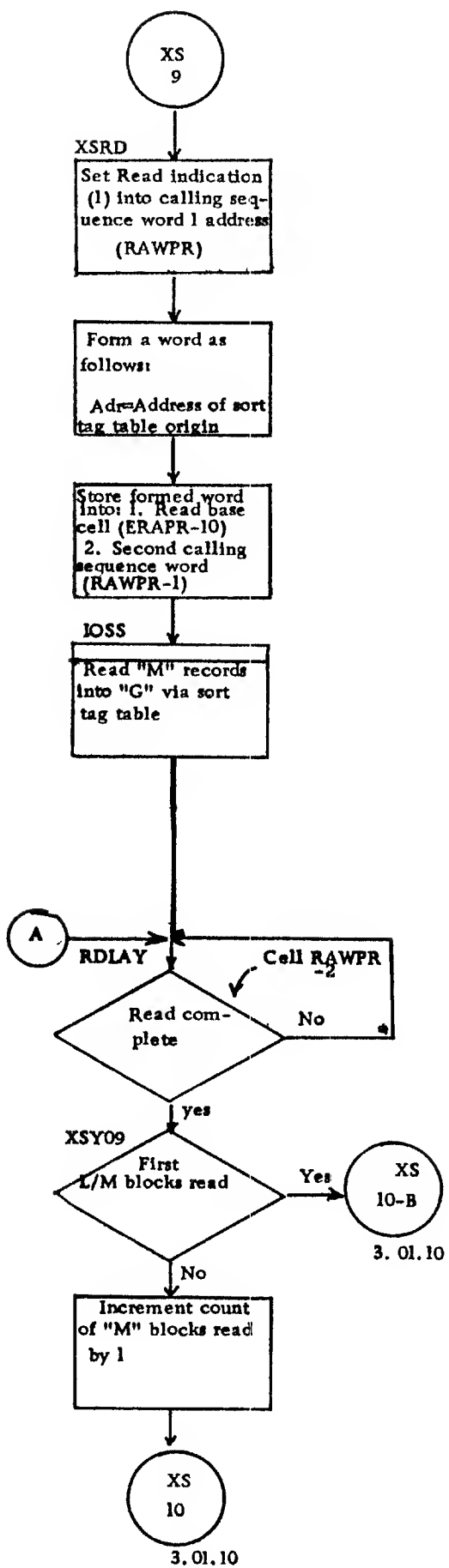


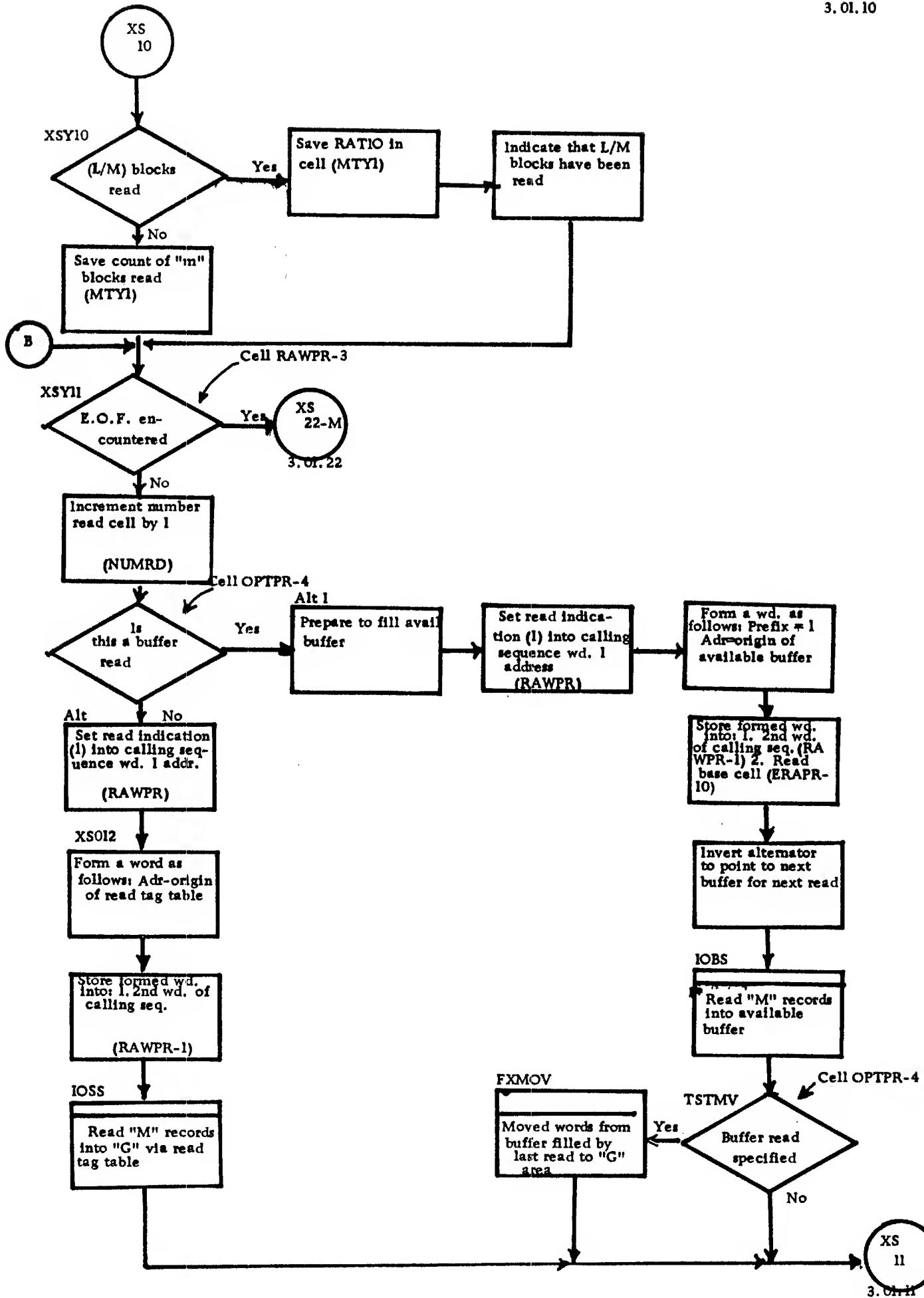


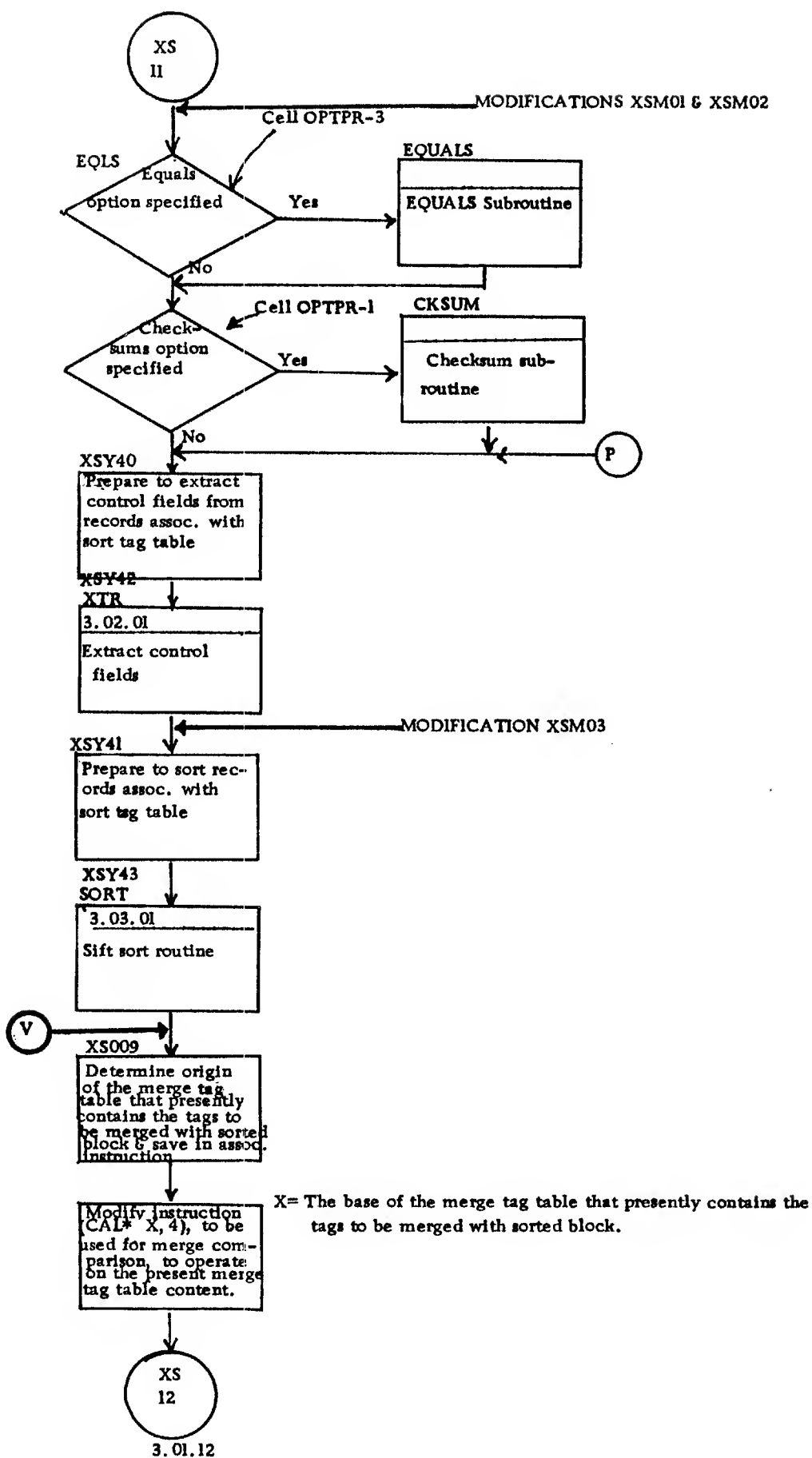


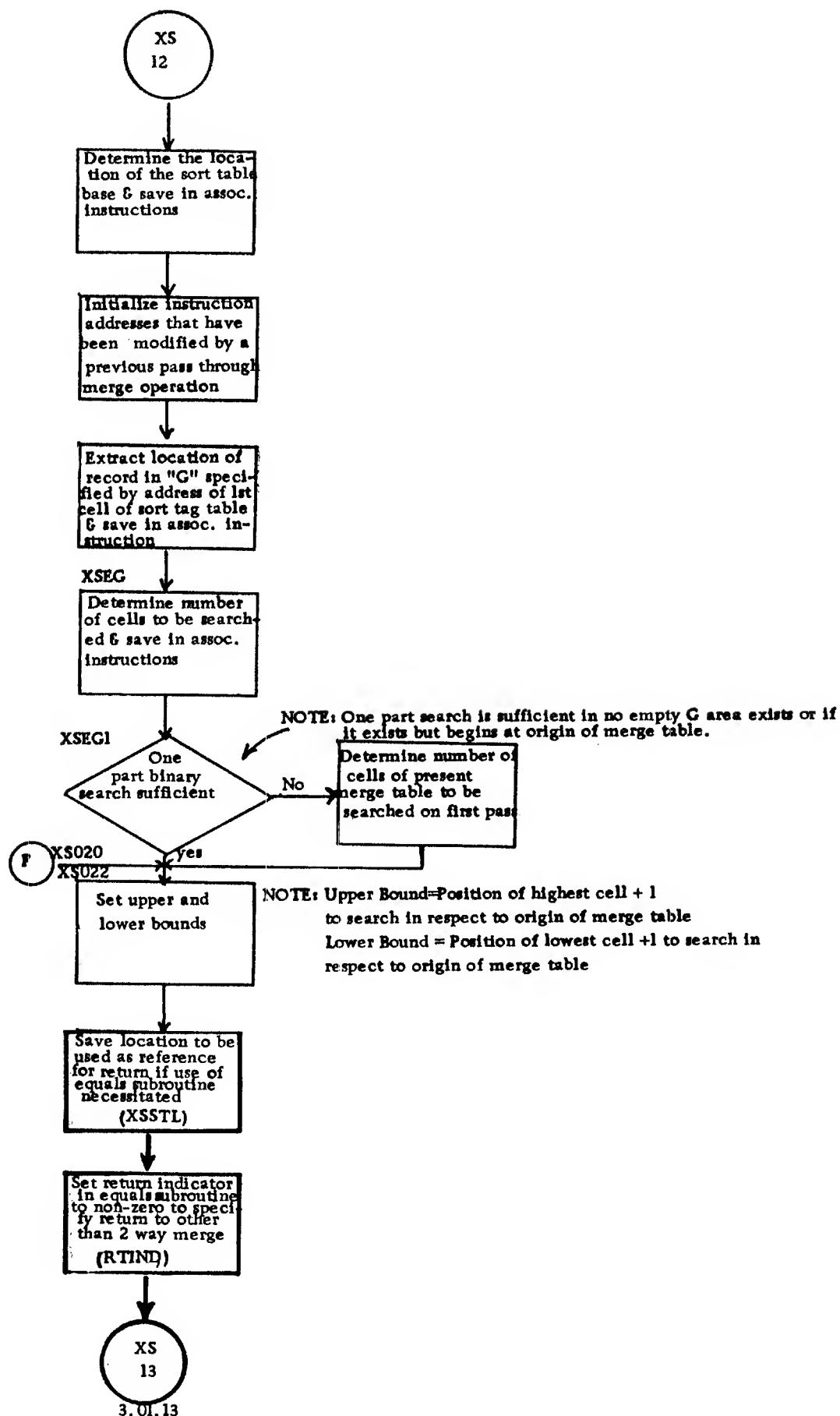




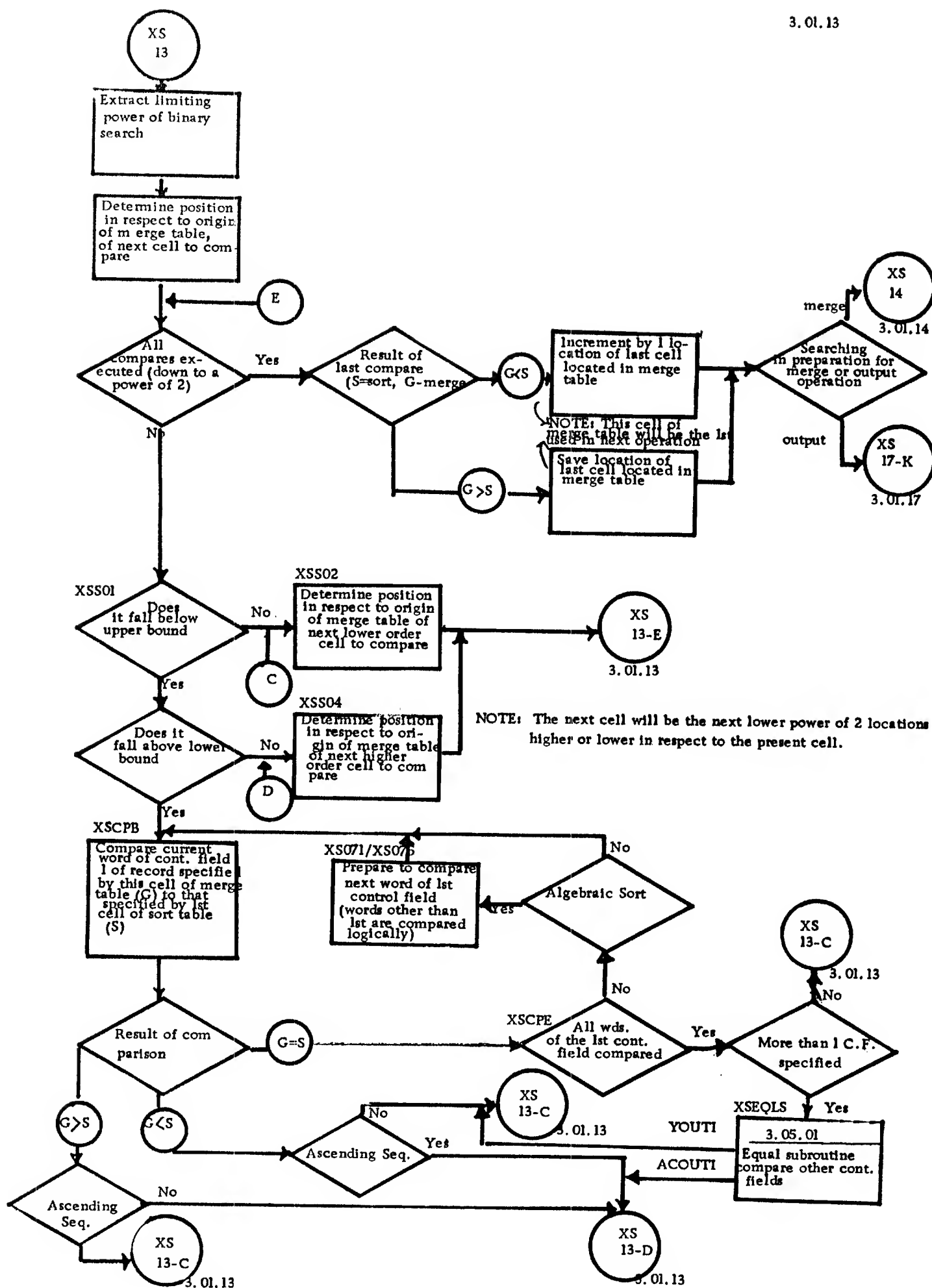


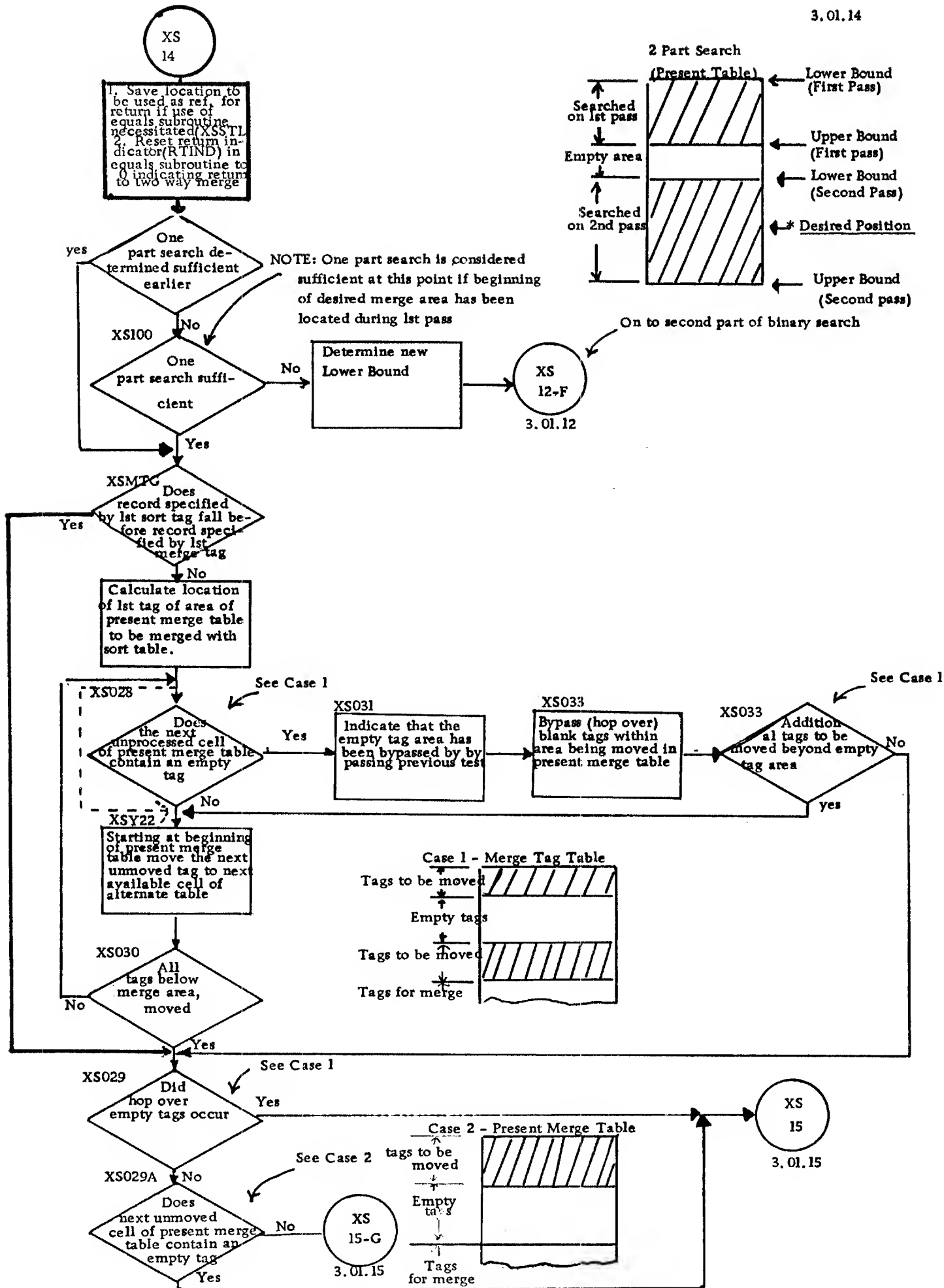


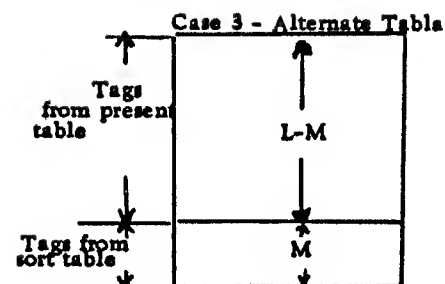
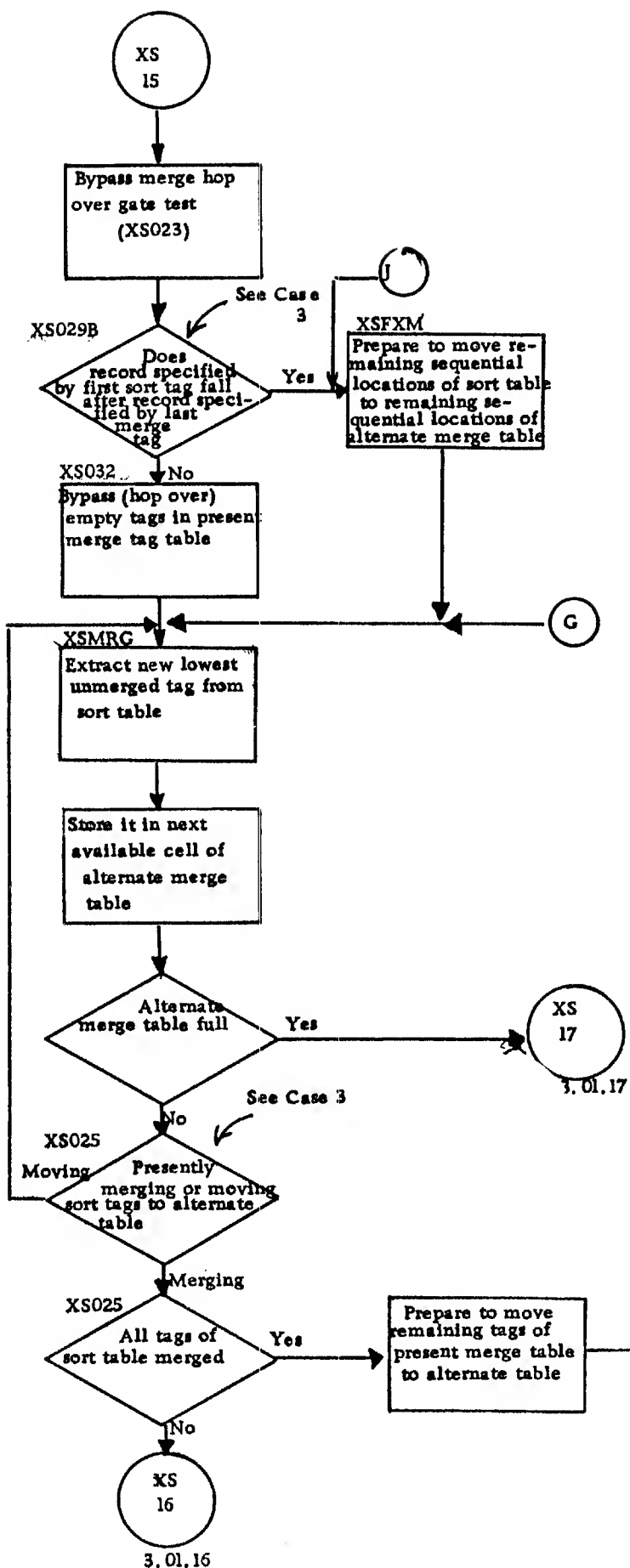


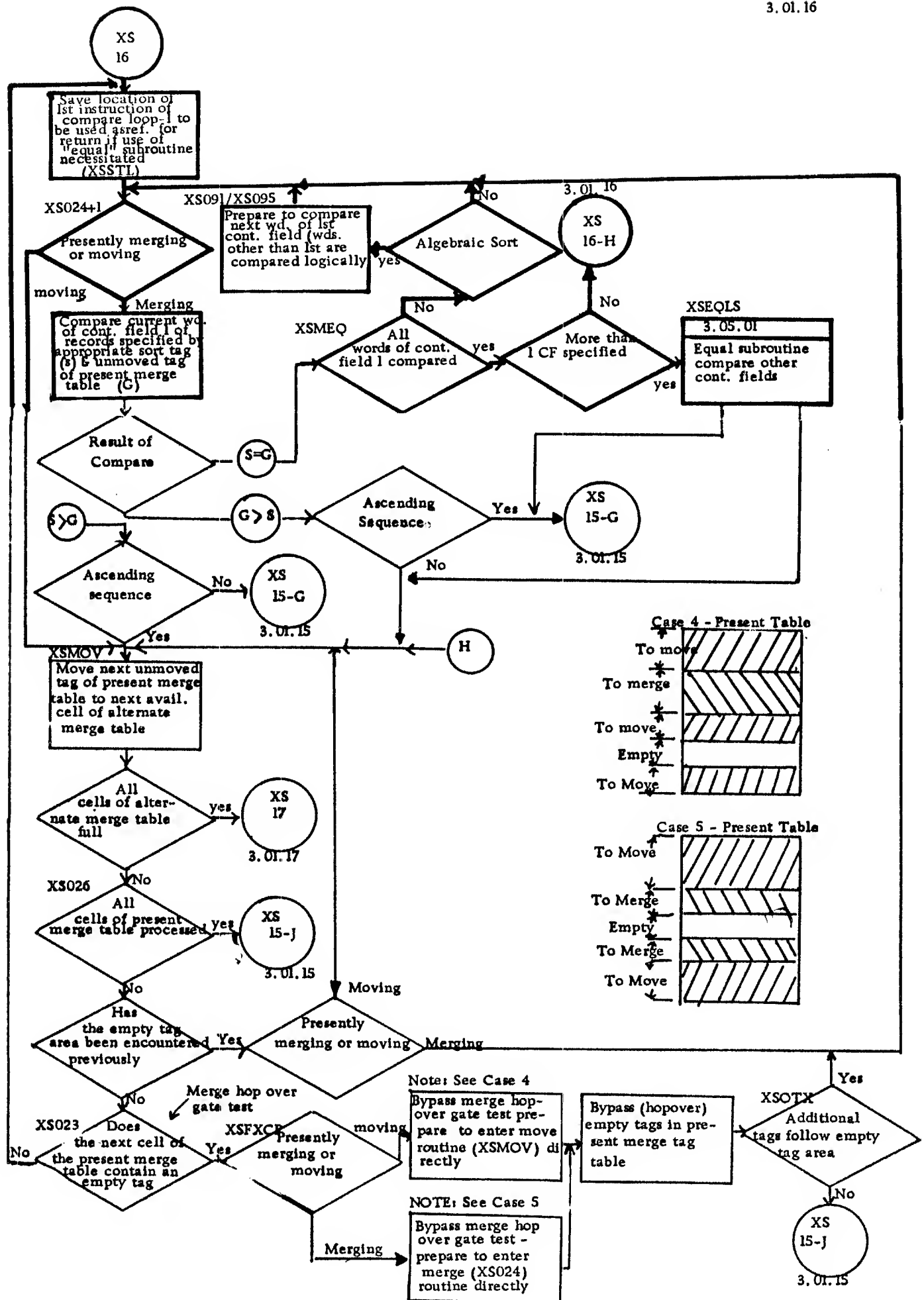


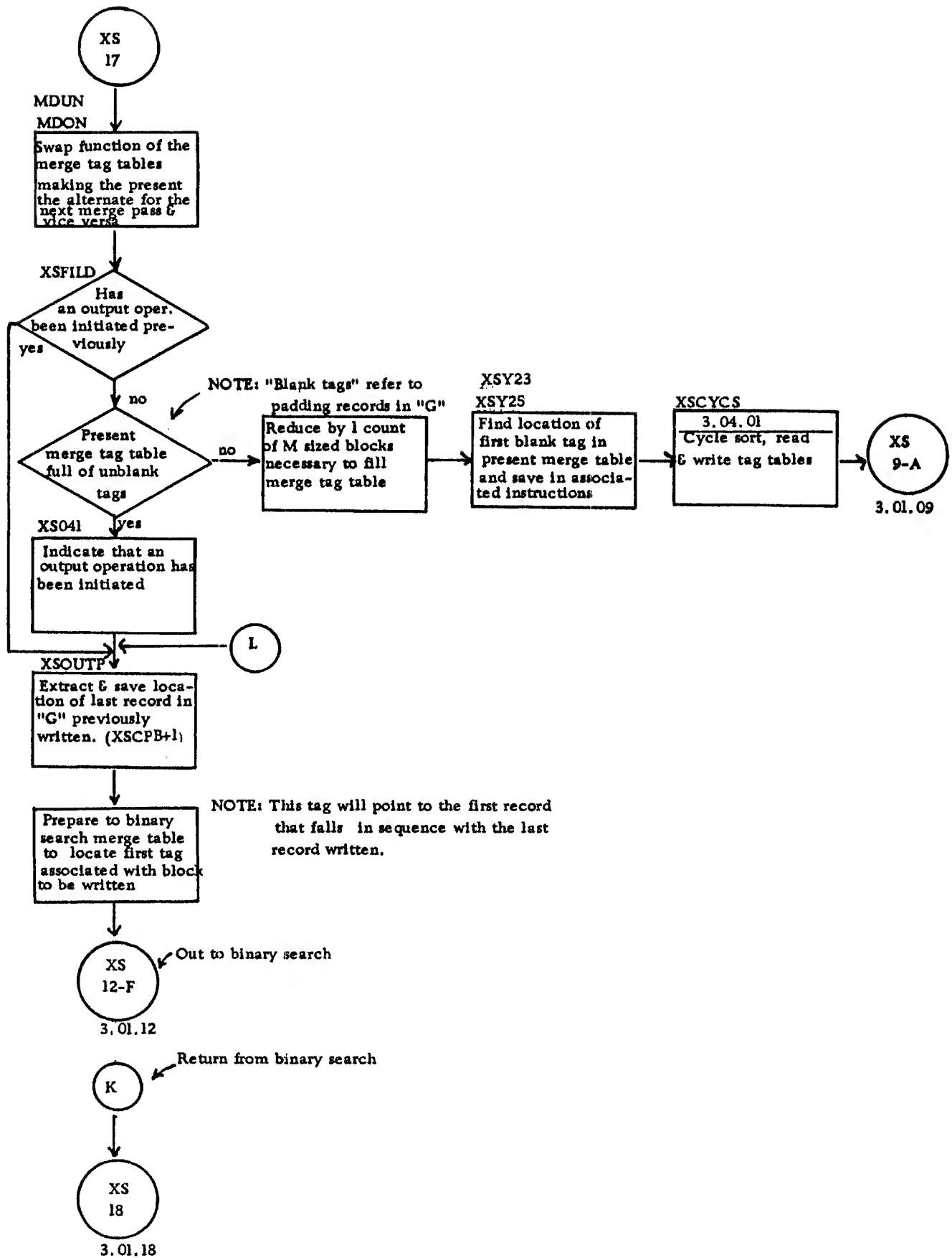


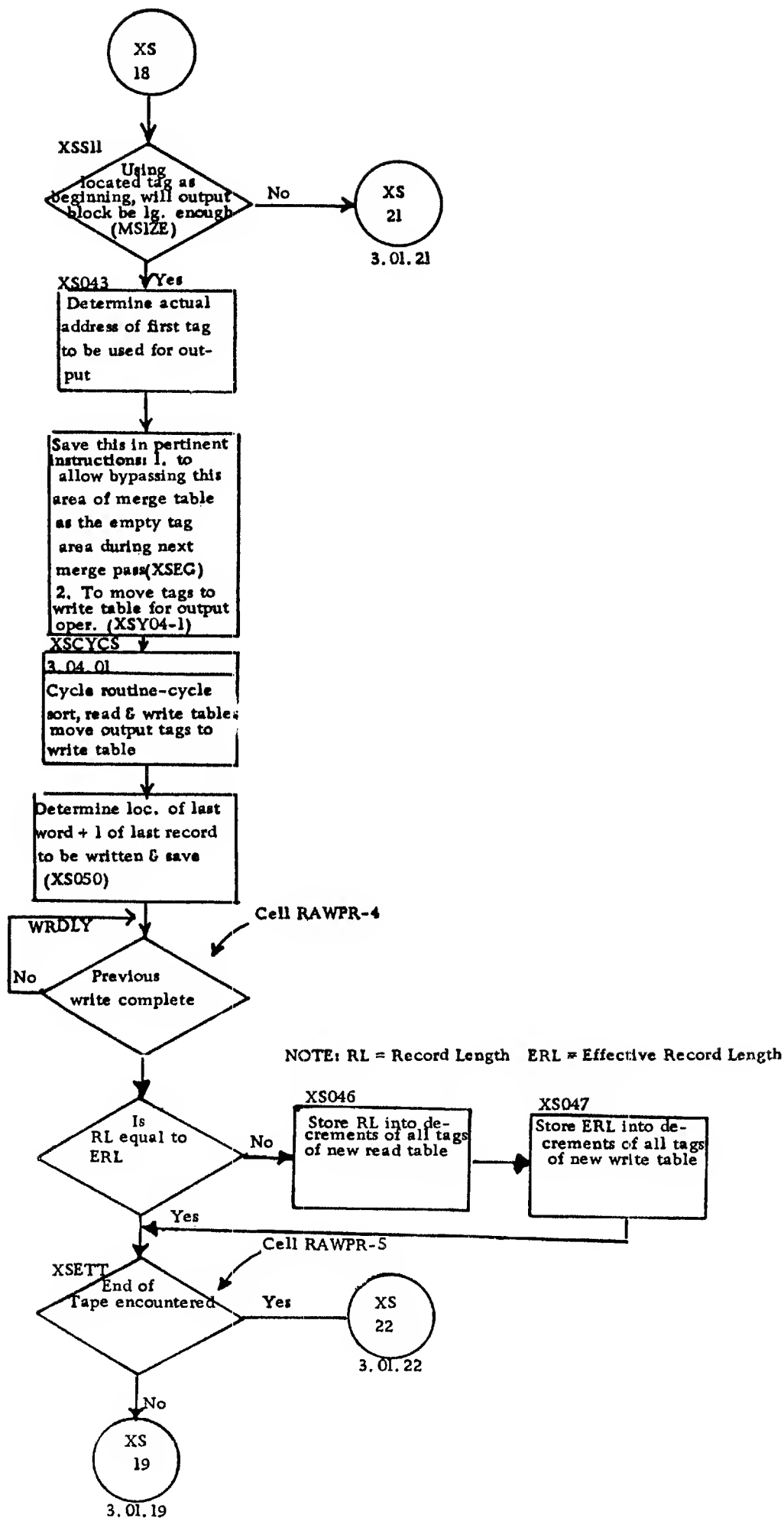


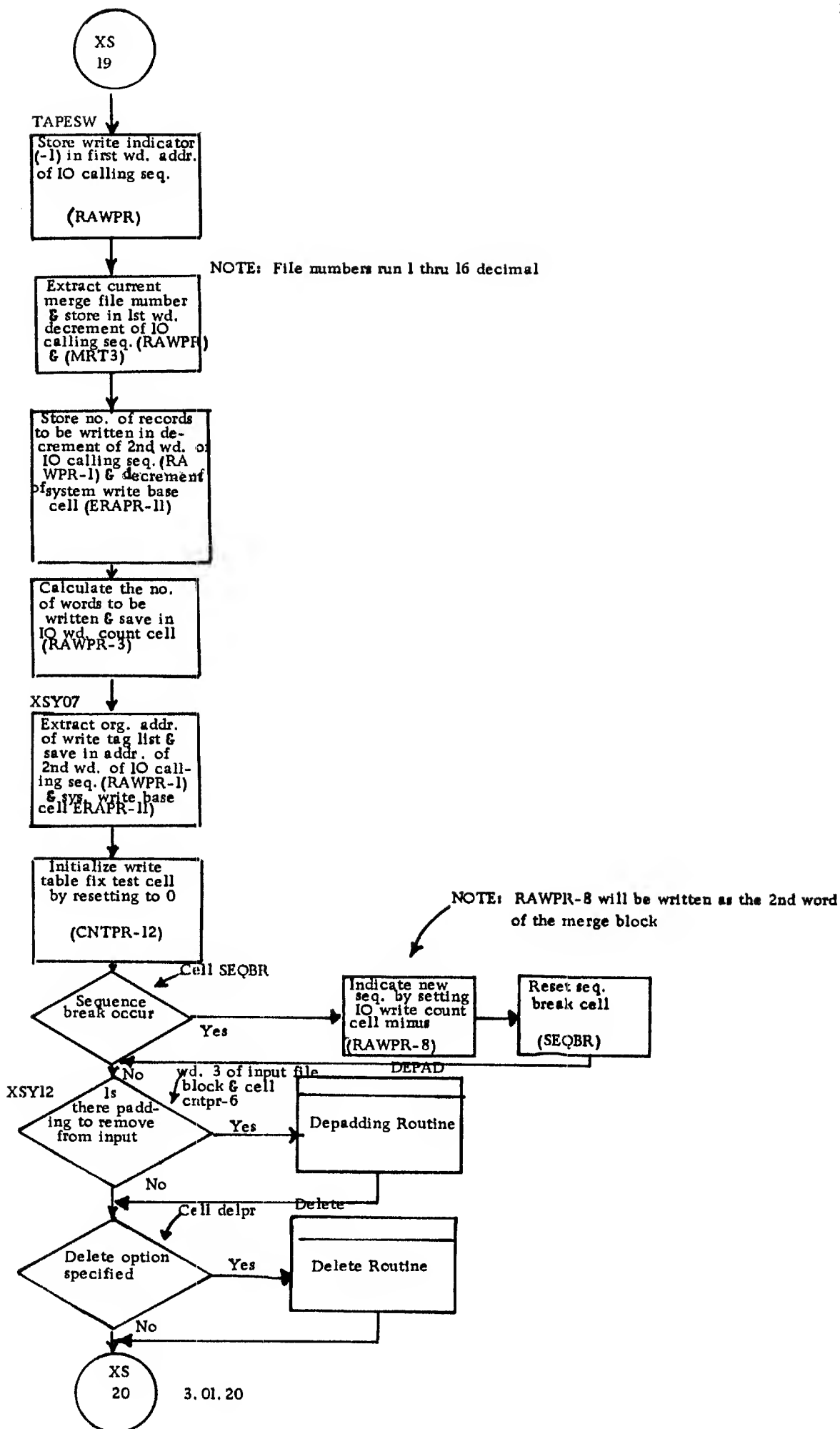


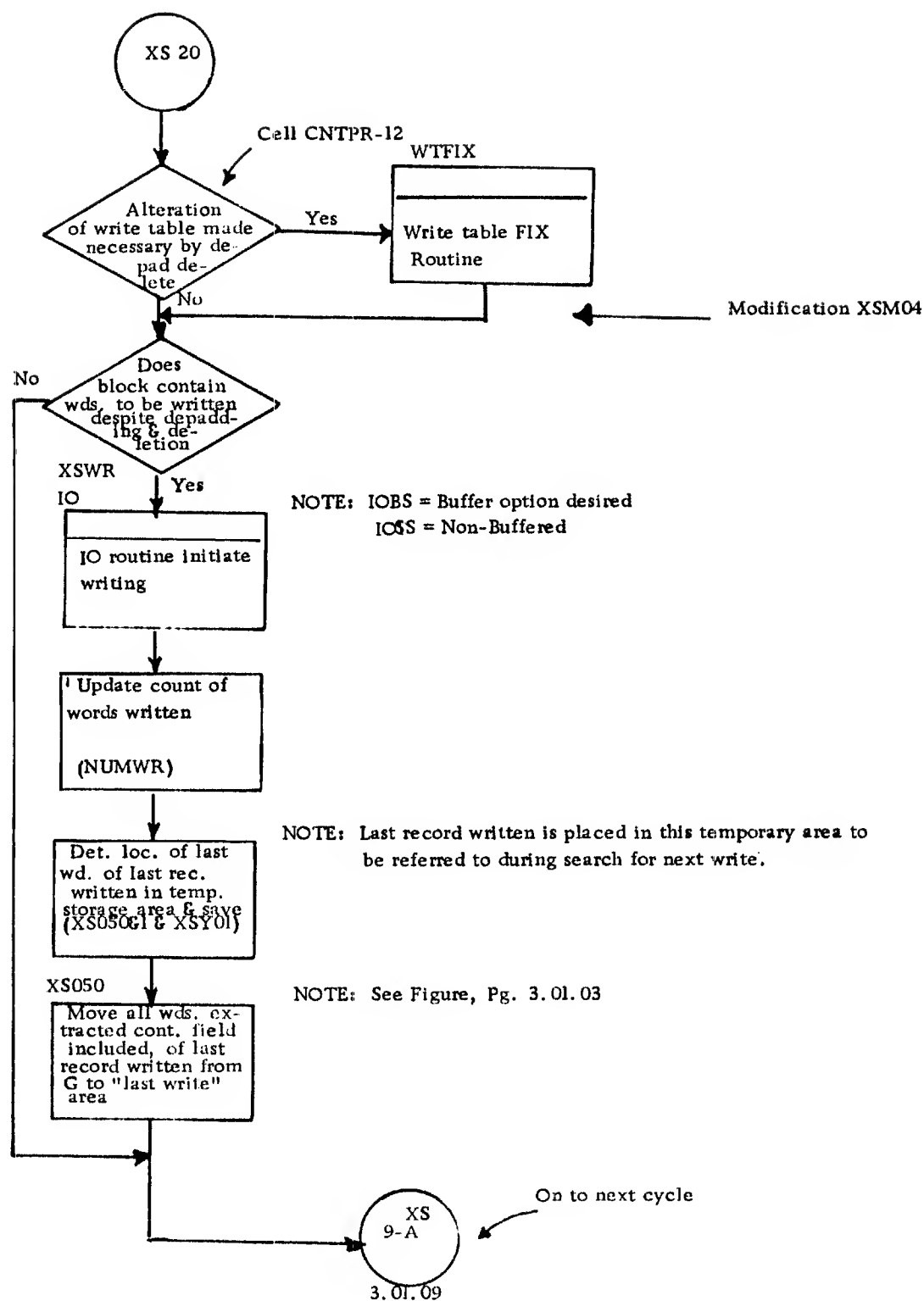




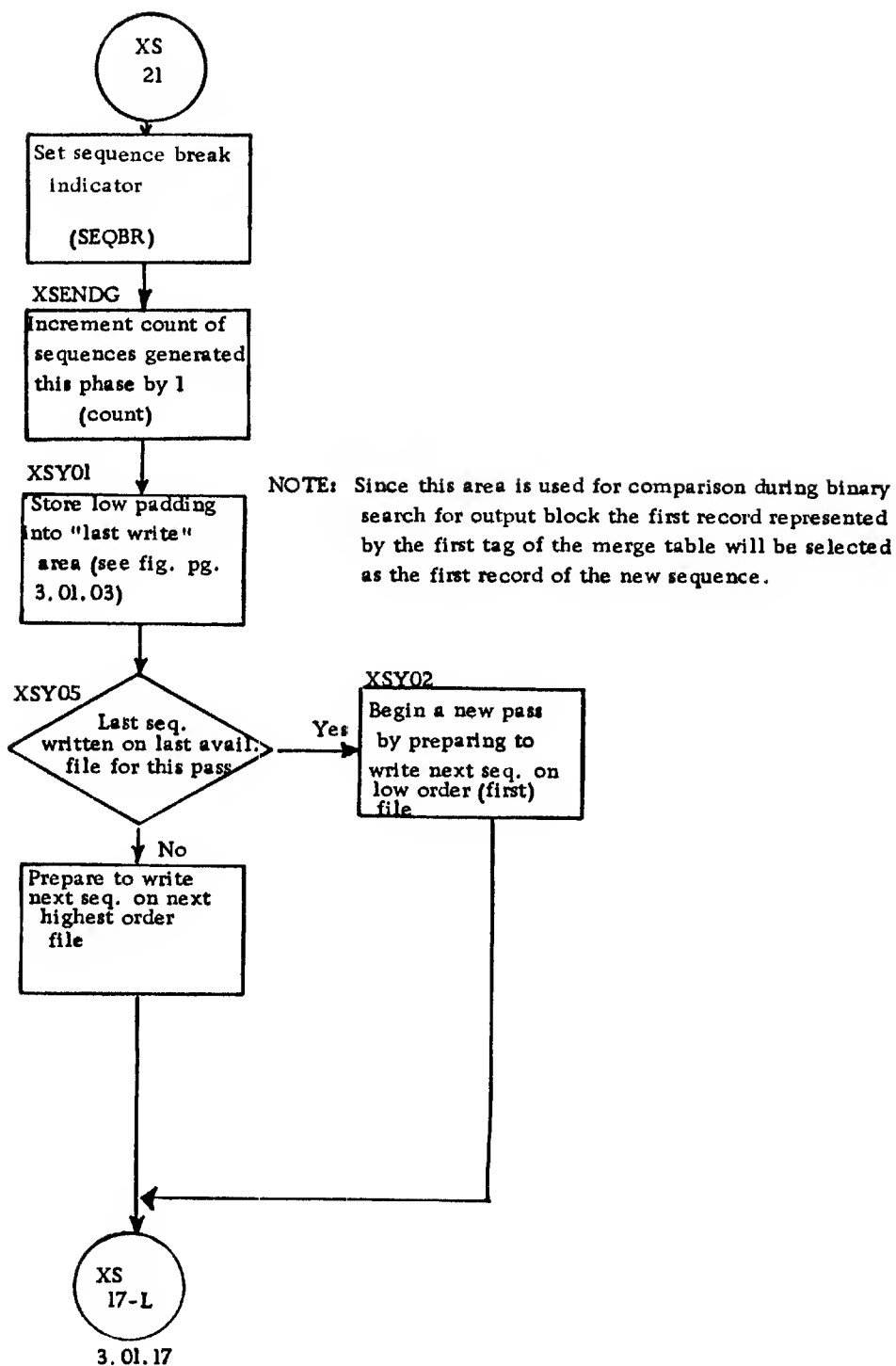




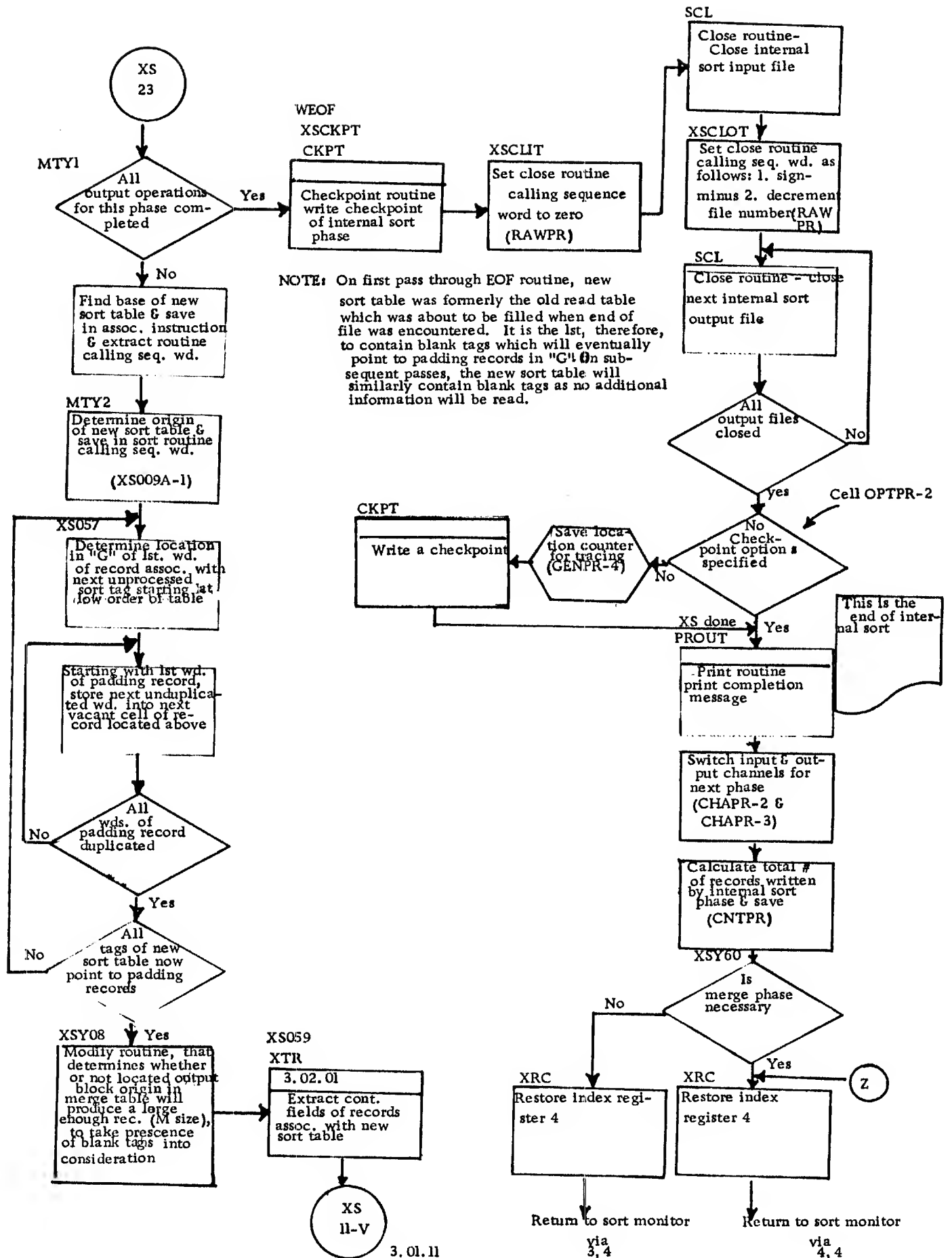












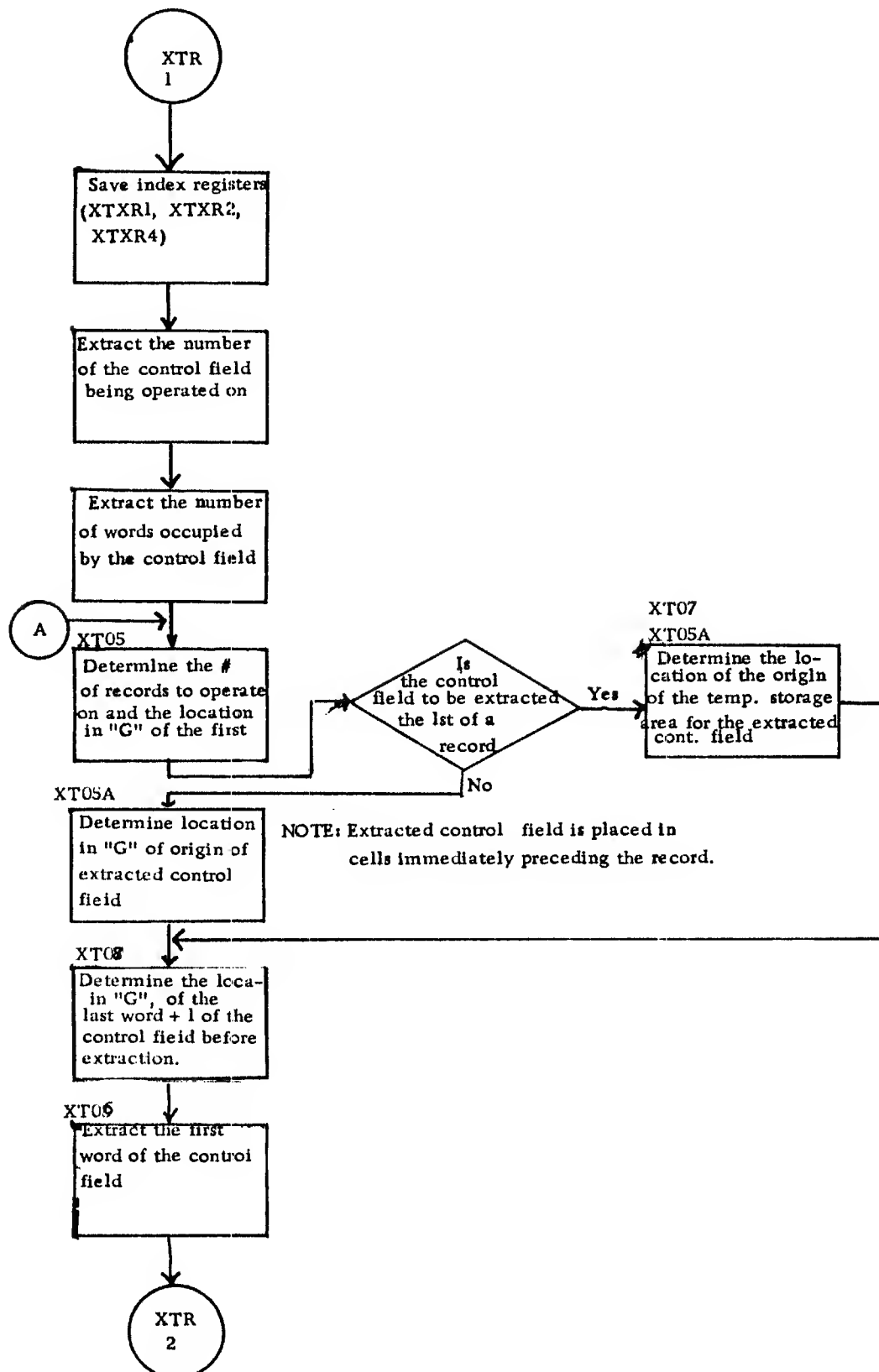
Extract routine -  
extract control fields  
from records

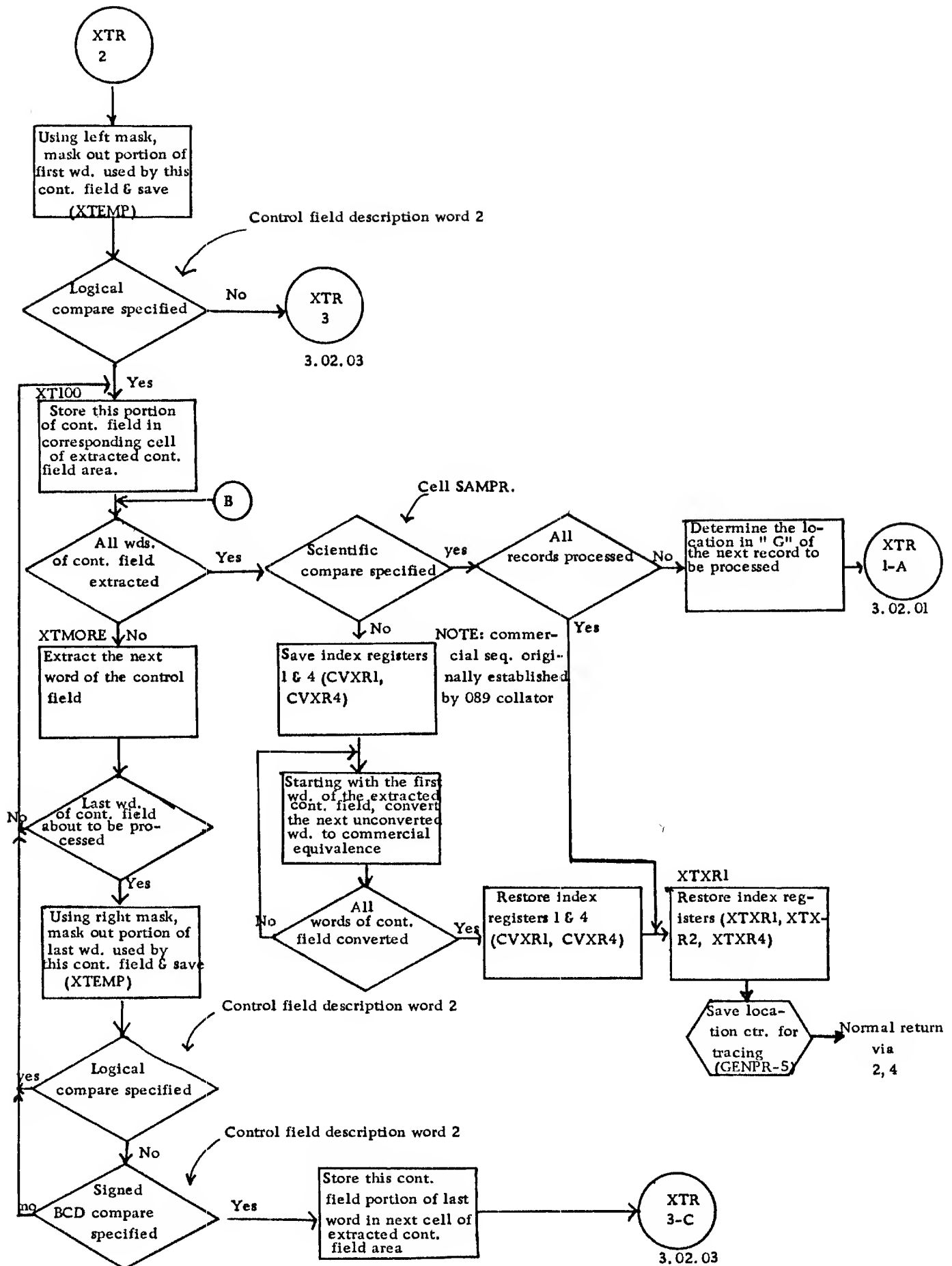
TSX XTR, 4

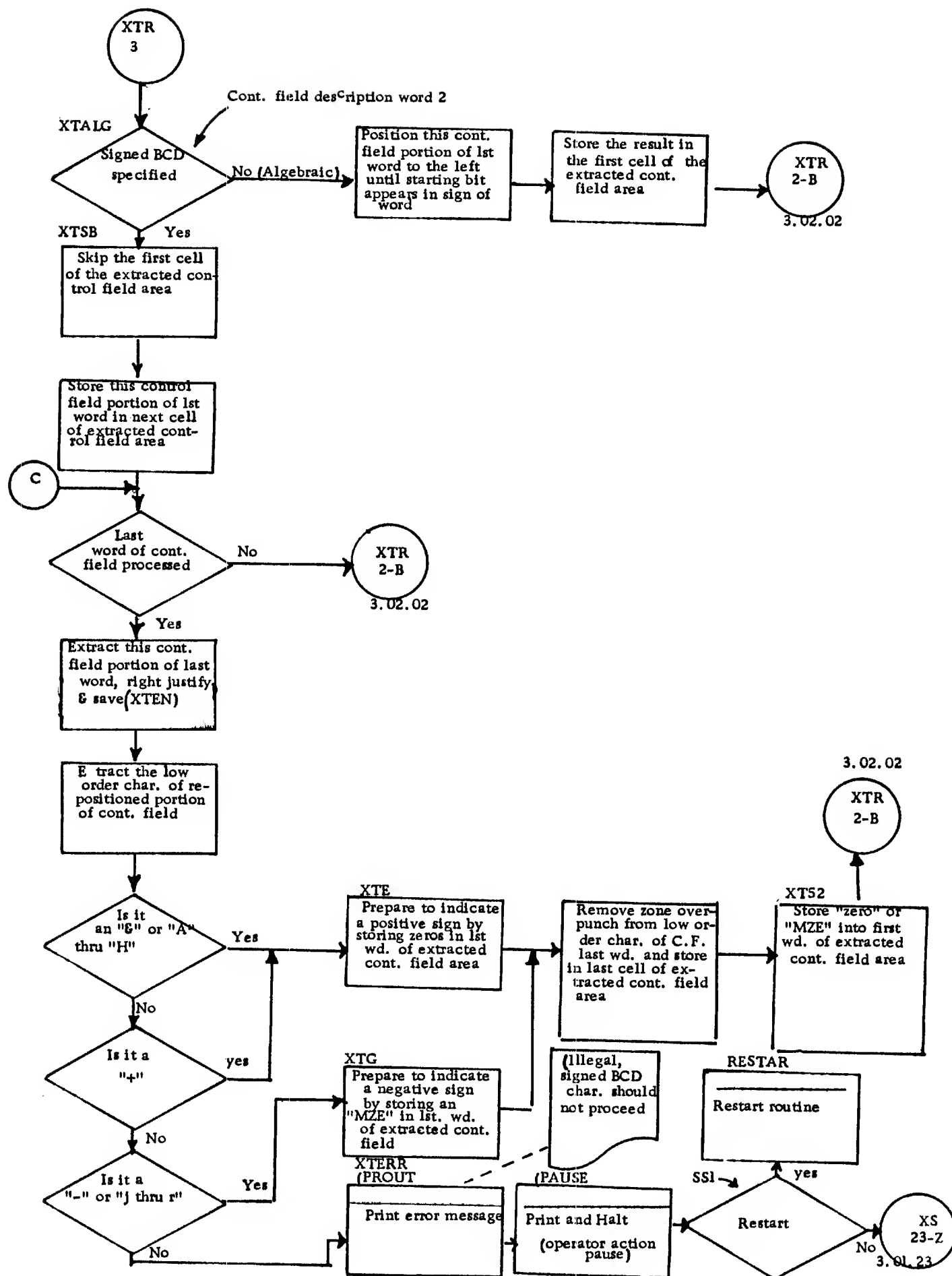
PZE TAGLIST,,No. of records

TAGLIST = Base of table containing tags referring to records  
from which control fields are to be extracted.

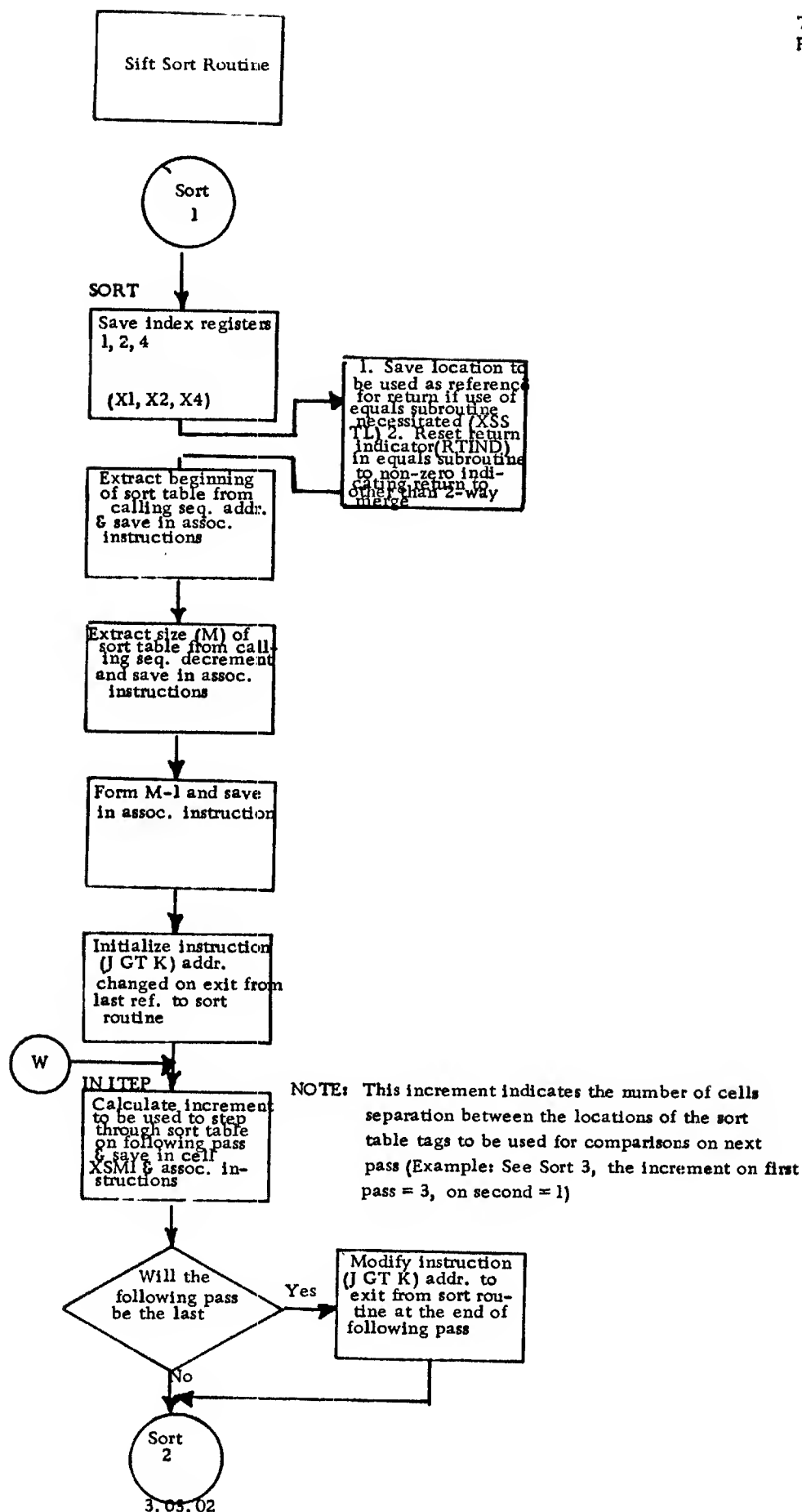
No. of records = number of records from which  
to extract control fields

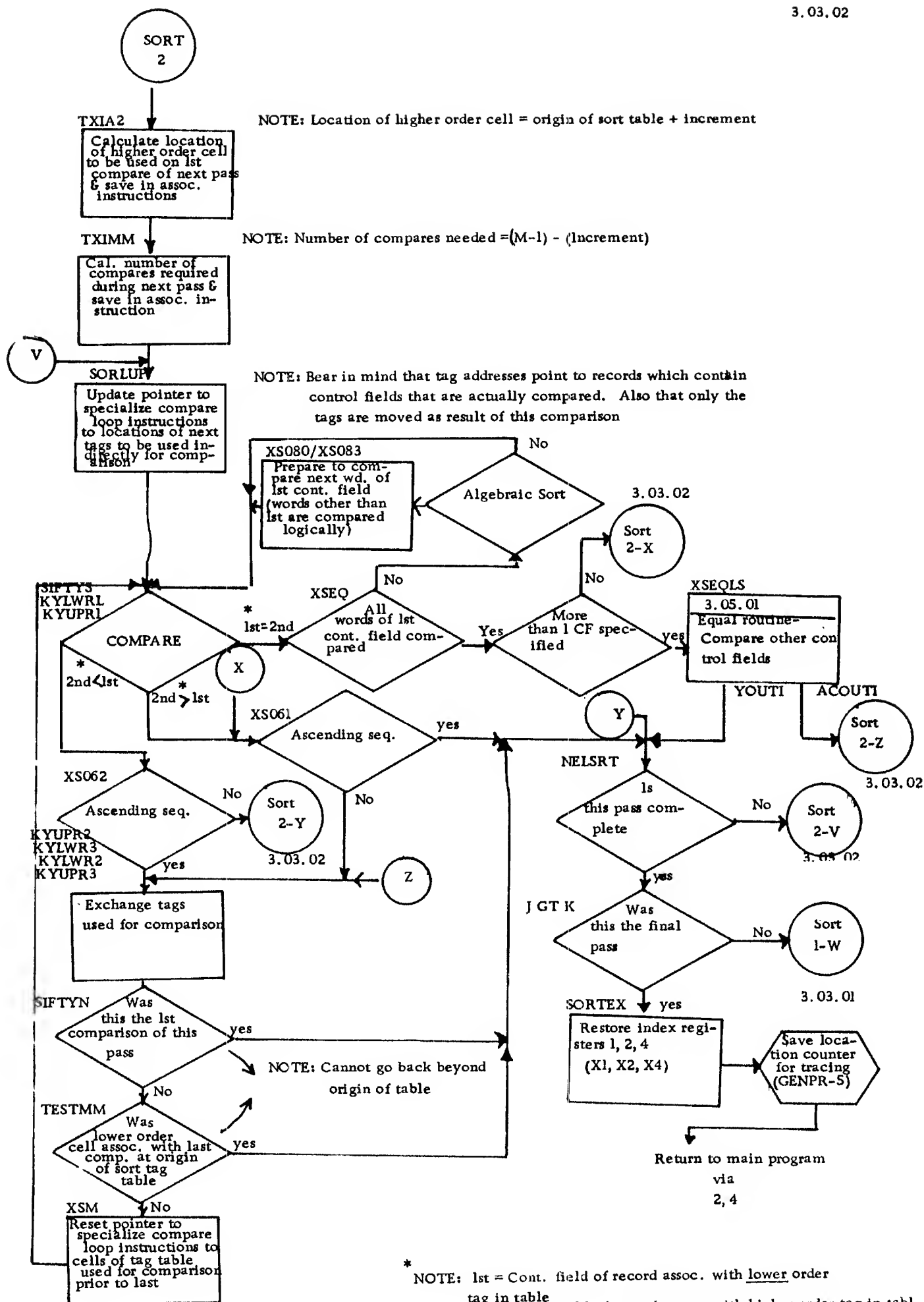






TSX SORT 4  
PZE Origin of sort table, , size of  
sort table

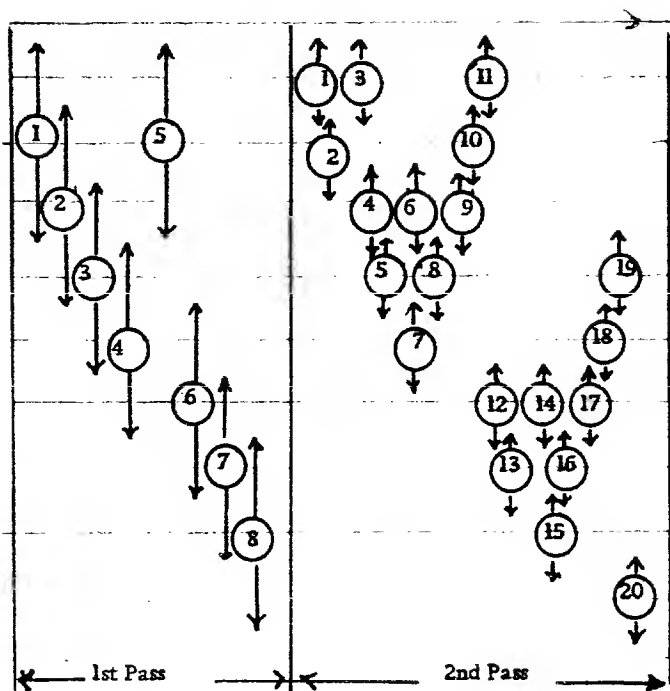






# EXAMPLE "SIFT" SORT

## SORT TAG TABLE



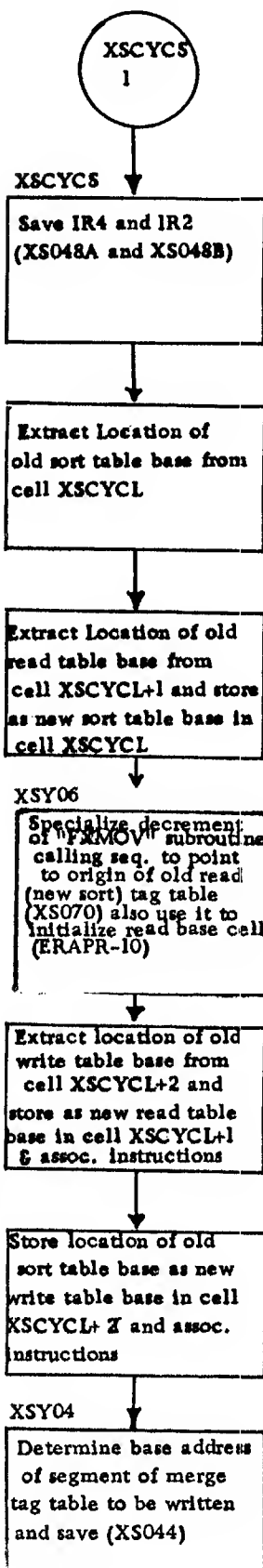
2050	(6) IOSP 3100, 1, 2	(2) IOSP 3106, 1, 2	(2) IOSP 3106, 1, 2	(1) IOSP 3104, 1, 2			(1) IOSP 3104, 1, 2
2051	(3) IOSP 3102, 1, 2		(3) IOSP 3102, 1, 2	(1) IOSP 3104, 1, 2	(2) IOSP 3106, 1, 2	(1) IOSP 3112, 1, 2	(1) IOSP 3112, 1, 2
2052	(1) IOSP 3104, 1, 2		(1) IOSP 3104, 1, 2	(3) IOSP 3102, 1, 2	(1) IOSP 3112, 1, 2	(2) IOSP 3106, 1, 2	(2) IOSP 3106, 1, 2
2053	(2) IOSP 3106, 1, 2	(6) IOSP 3100, 1, 2	(5) IOSP 3114, 1, 2	(4) IOSP 3110, 1, 2	(1) IOSP 3112, 1, 2	(3) IOSP 3102, 1, 2	(3) IOSP 3102, 1, 2
2054	(4) IOSP 3110, 1, 2		(4) IOSP 3110, 1, 2	(5) IOSP 3114, 1, 2	(1) IOSP 3112, 1, 2	(4) IOSP 3110, 1, 2	(3) IOSP 3120, 1, 2
2055	(1) IOSP 3112, 1, 2		(1) IOSP 3112, 1, 2	(5) IOSP 3114, 1, 2	(3) IOSP 3120, 1, 2	(4) IOSP 3110, 1, 2	(4) IOSP 3110, 1, 2
2056	(5) IOSP 3114, 1, 2	(6) IOSP 3100, 1, 2	(6) IOSP 3106, 1, 2	(5) IOSP 3116, 1, 2	(3) IOSP 3120, 1, 2	(5) IOSP 3114, 1, 2	(5) IOSP 3114, 1, 2
2057	(5) IOSP 3116, 1, 2		(5) IOSP 3116, 1, 2	(6) IOSP 3100, 1, 2	(3) IOSP 3120, 1, 2	(5) IOSP 3116, 1, 2	(5) IOSP 3116, 1, 2
2060	(3) IOSP 3120, 1, 2		(3) IOSP 3120, 1, 2	(6) IOSP 3100, 1, 2			(6) IOSP 3100, 1, 2
2061	(7) IOSP 3122, 1, 2		(7) IOSP 3122, 1, 2				(7) IOSP 3122, 1, 2
	← Initial →		← After 1st pass →				← After 2nd Pass Final →

The above illustrates the "sift" sorting process used in the 7090 Sort System. For purposes of simplification a logical ascending sort of one word records and an "M" of ten words was assumed. In like manner the sort table was assumed to begin at location 2050. Two passes are required to complete the sort. The sequence of the comparisons within each pass is given at the left side of the page. The large chart points out the exchange of tags resulting from the comparisons. The content of the extracted control field of the record in "G" to be sorted is shown to the right.

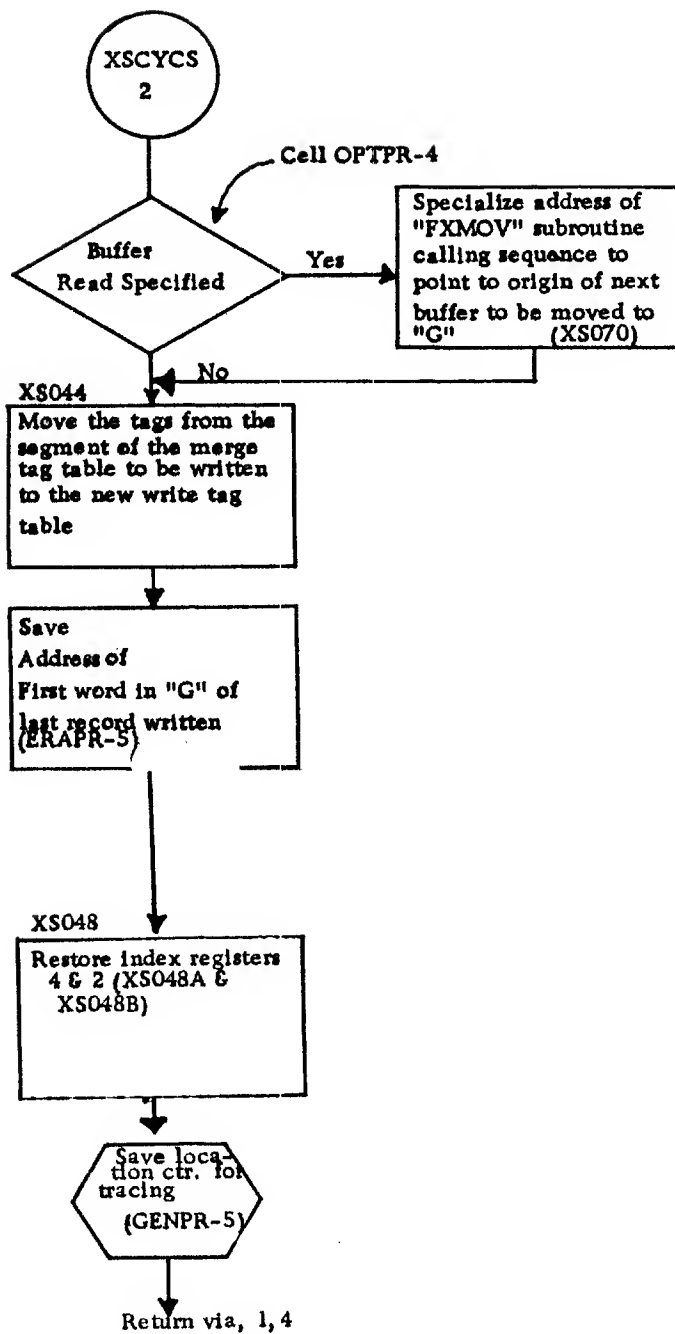
3.03.03

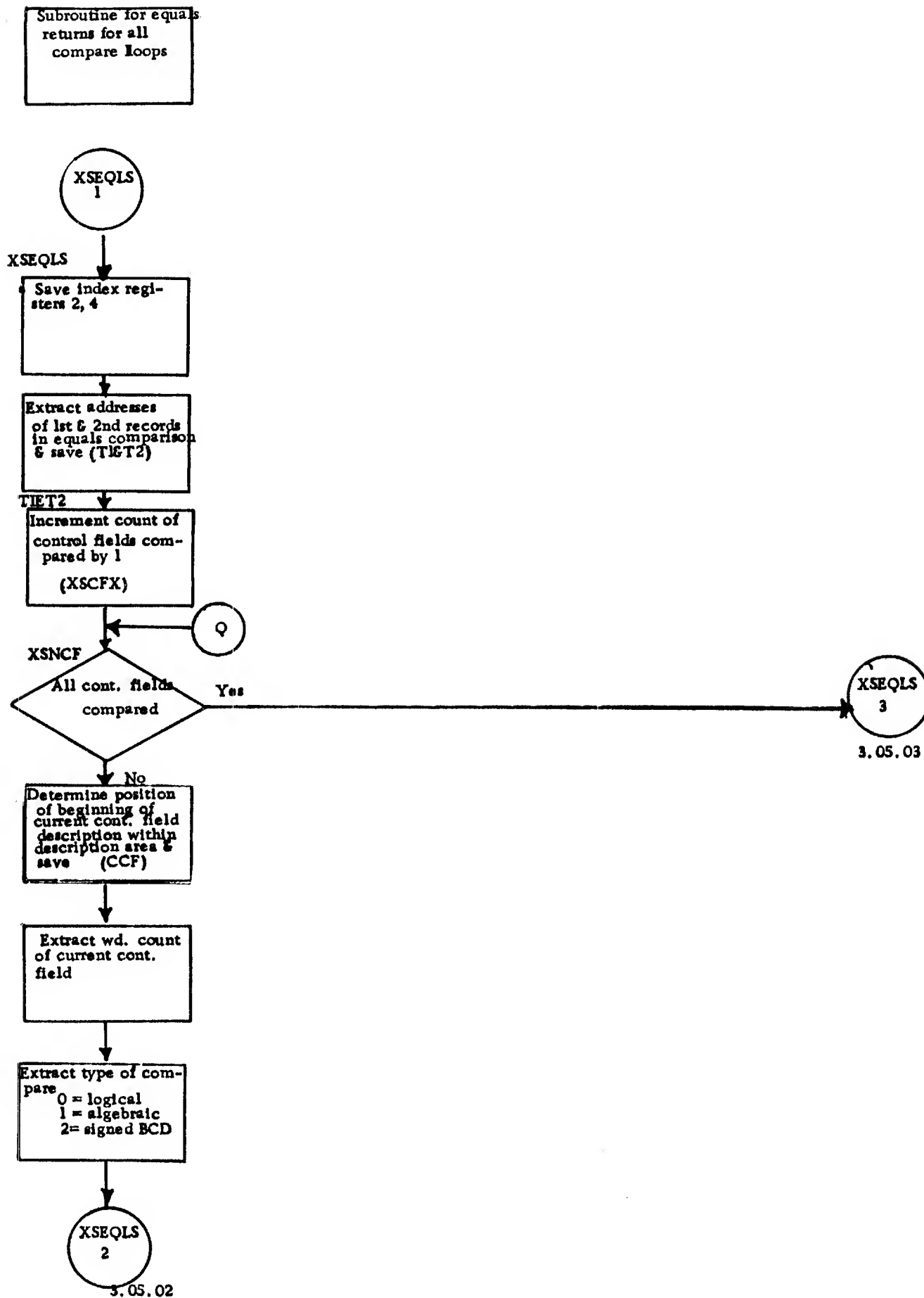
6
3
1
2
4
1
5
5
3
7

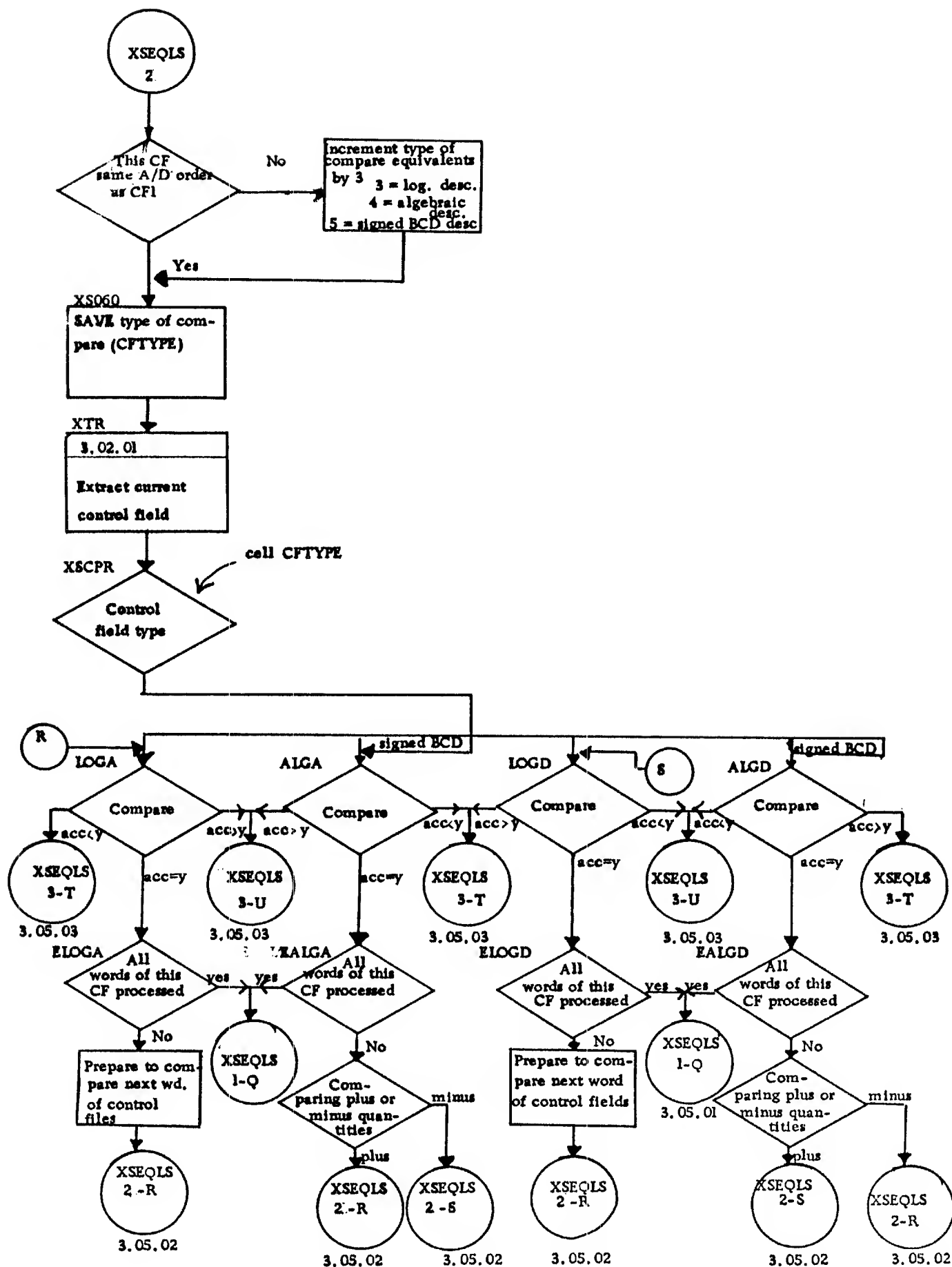
Cycle Subroutine

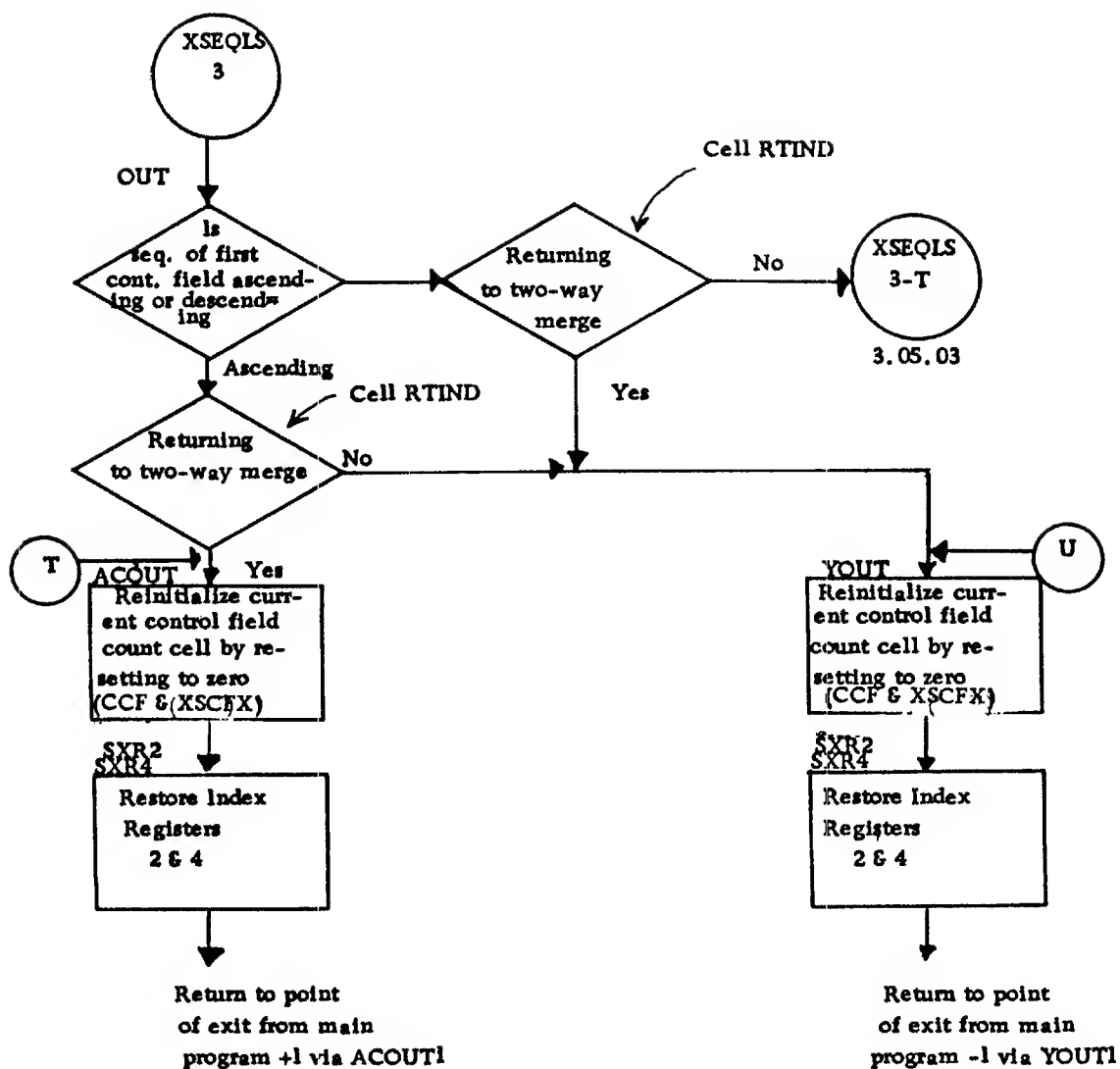


NOTE: The contents of a buffer, specified later,  
will be moved to cells in "G" specified by  
these tag addresses.

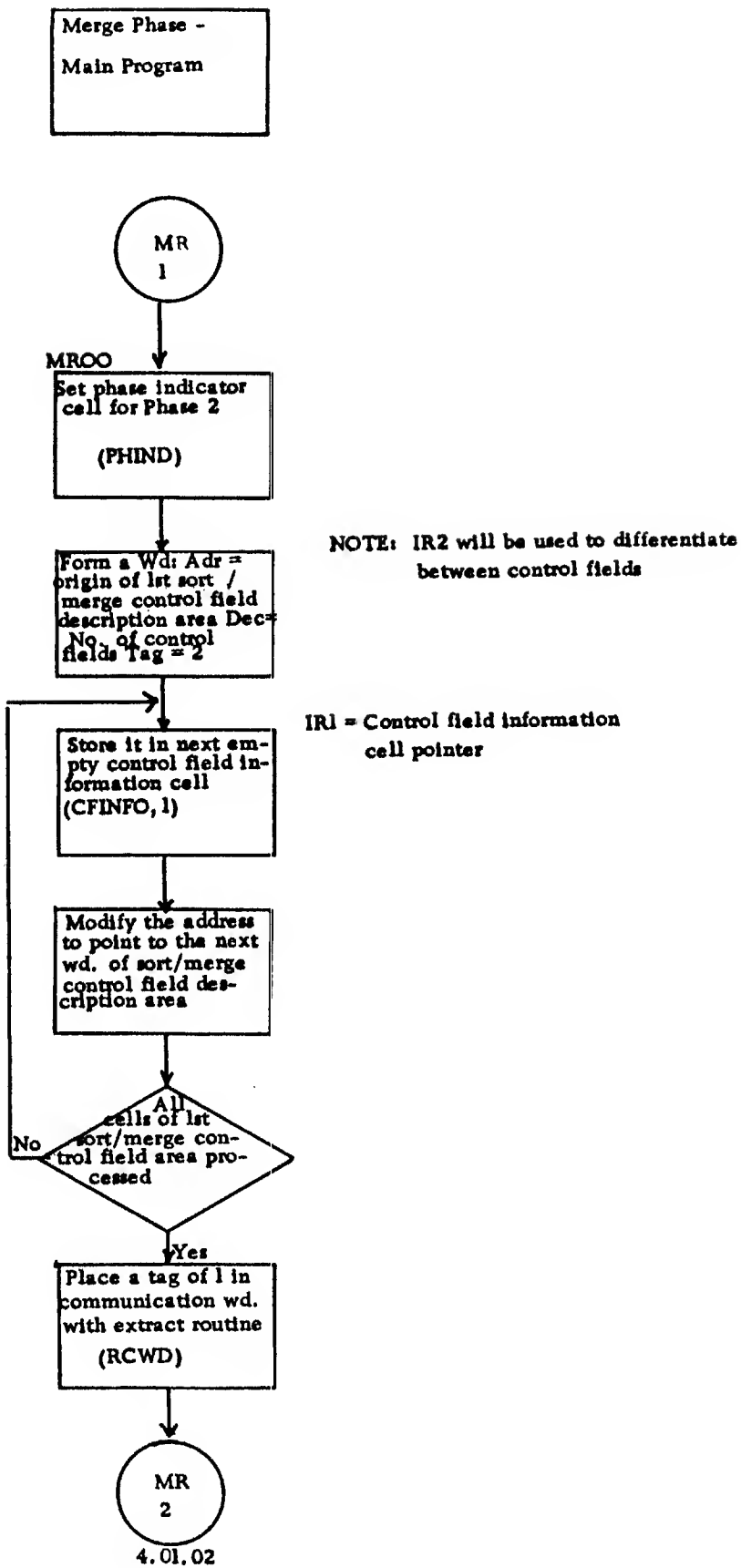




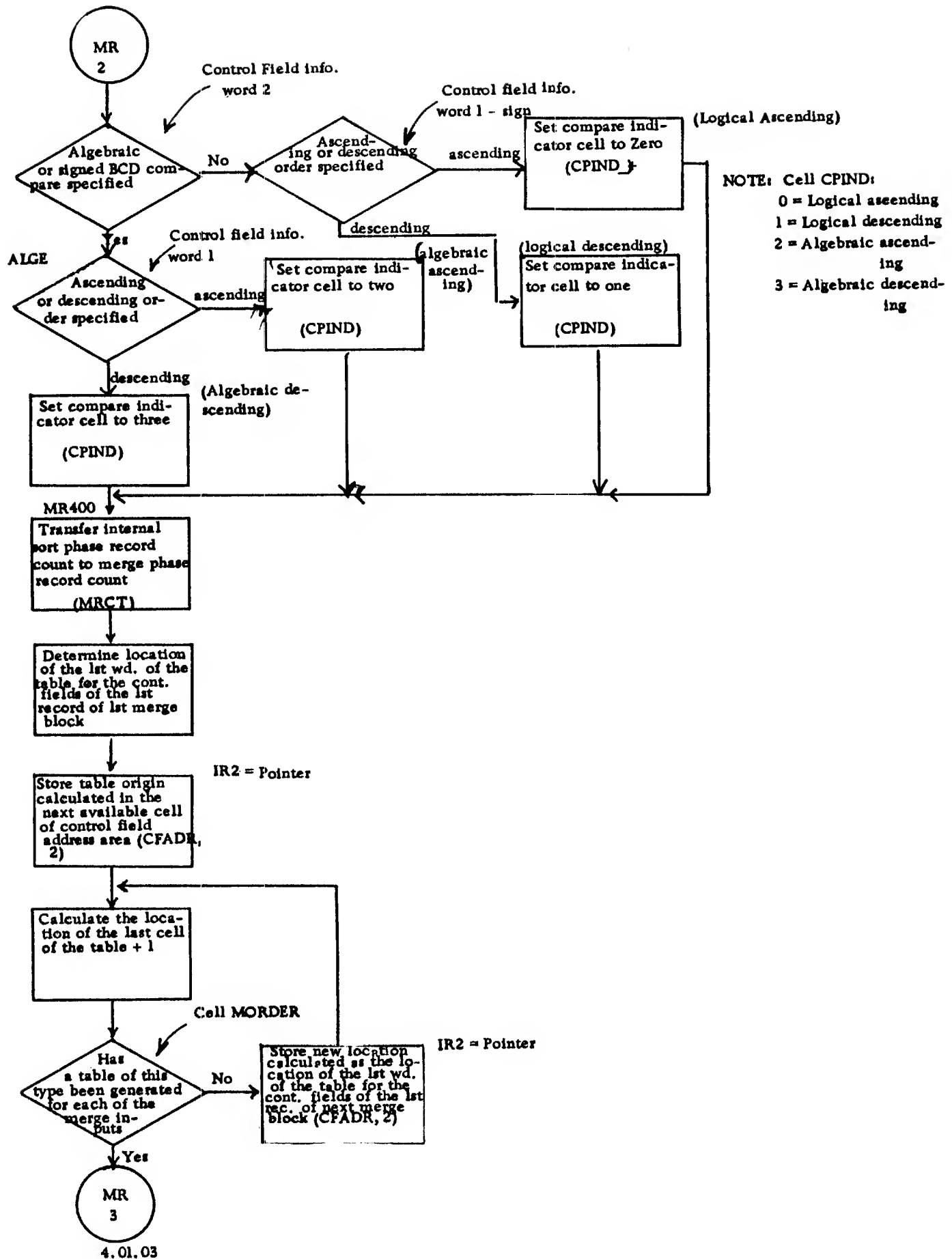


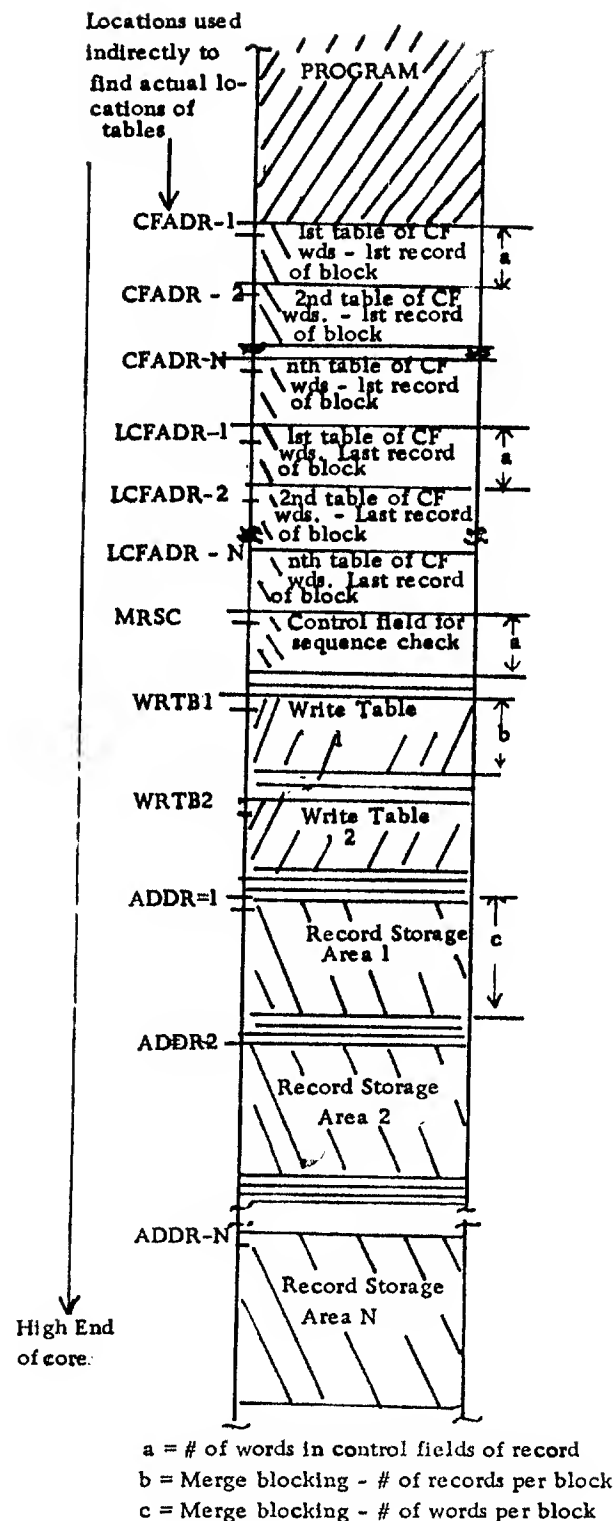
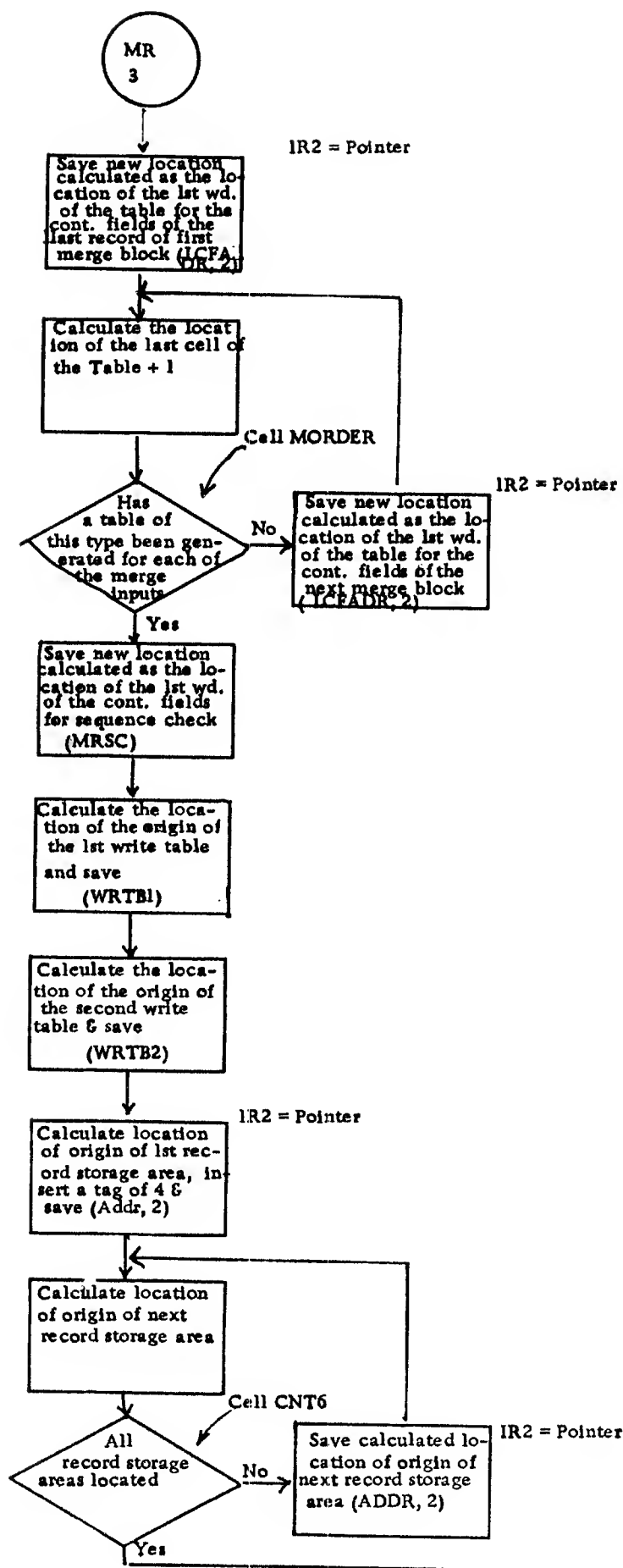


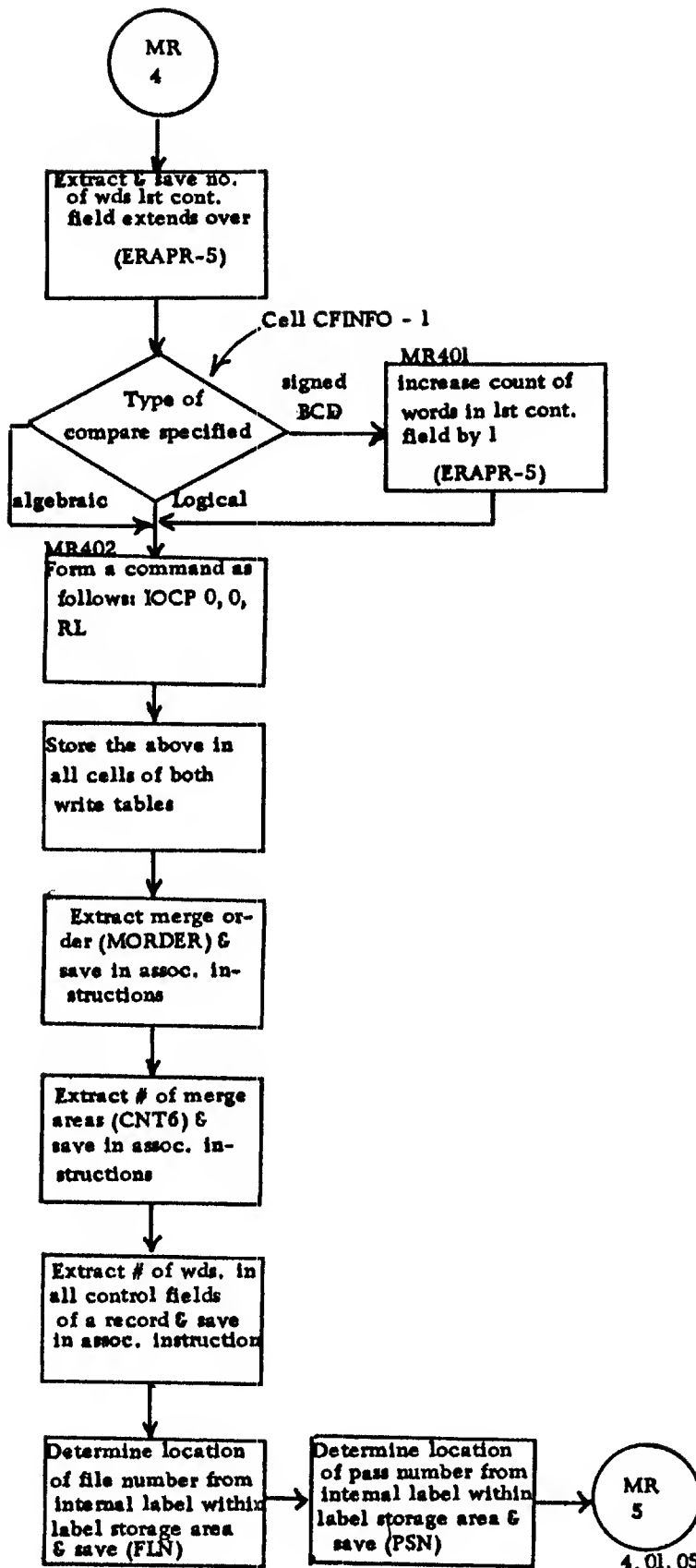


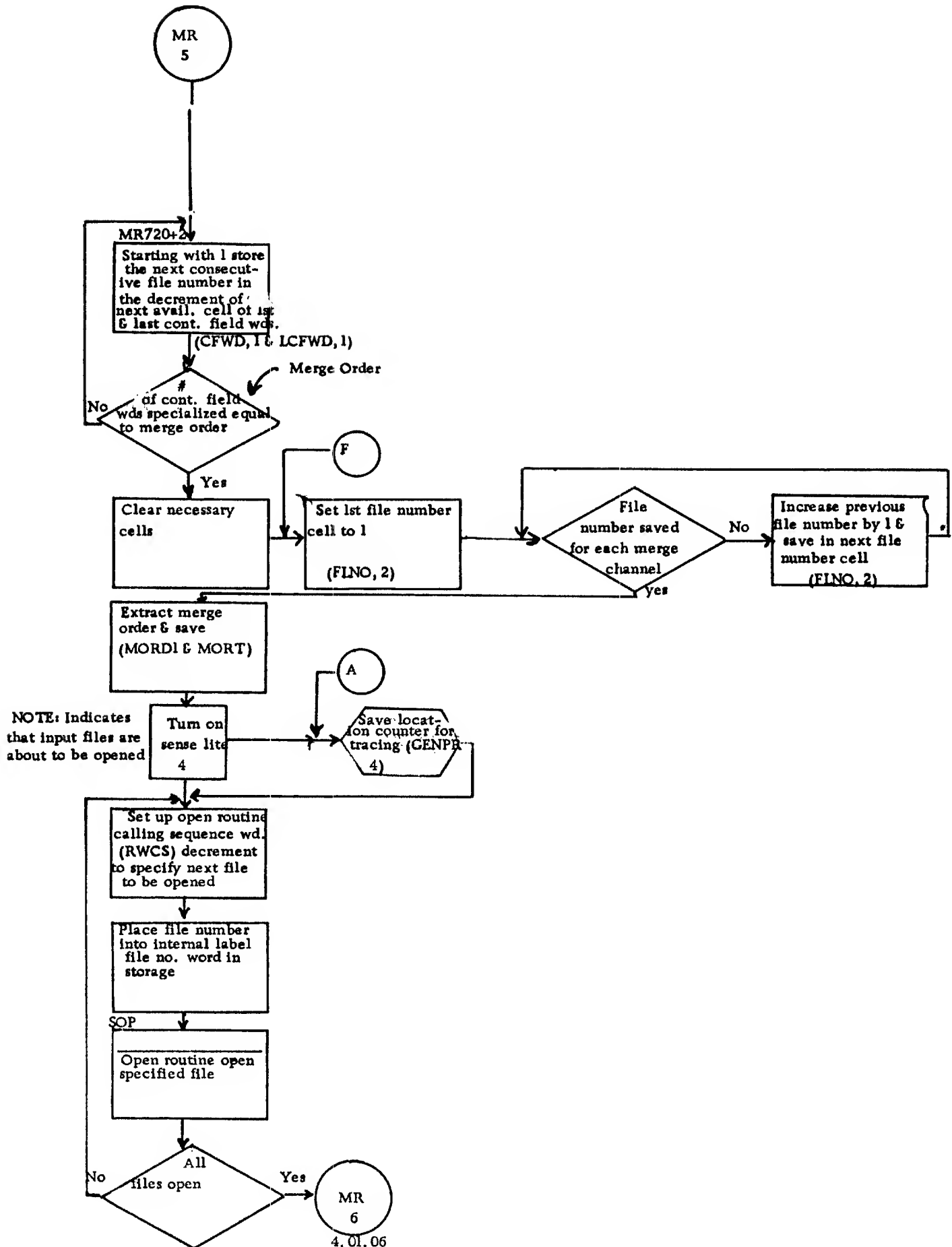


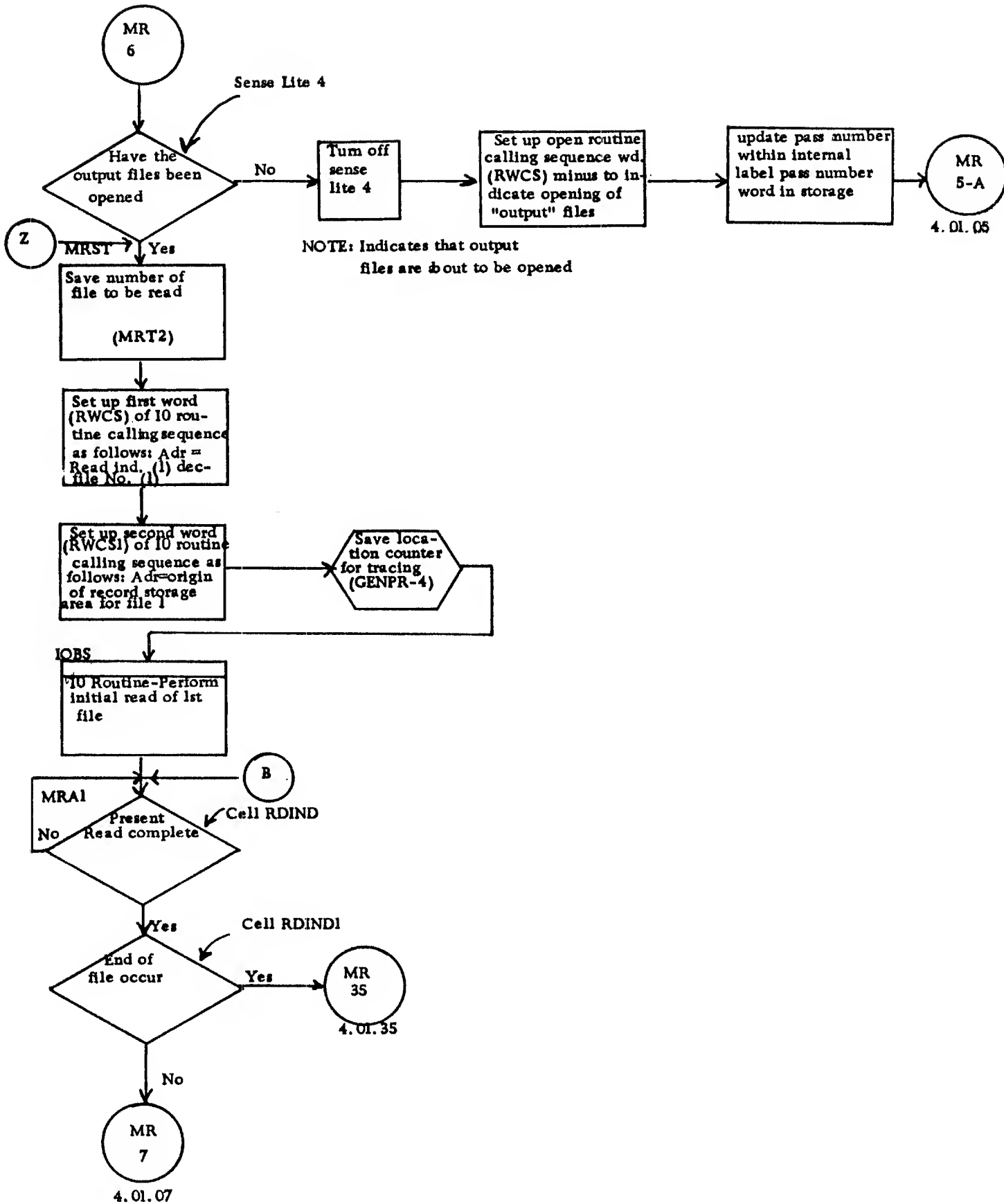


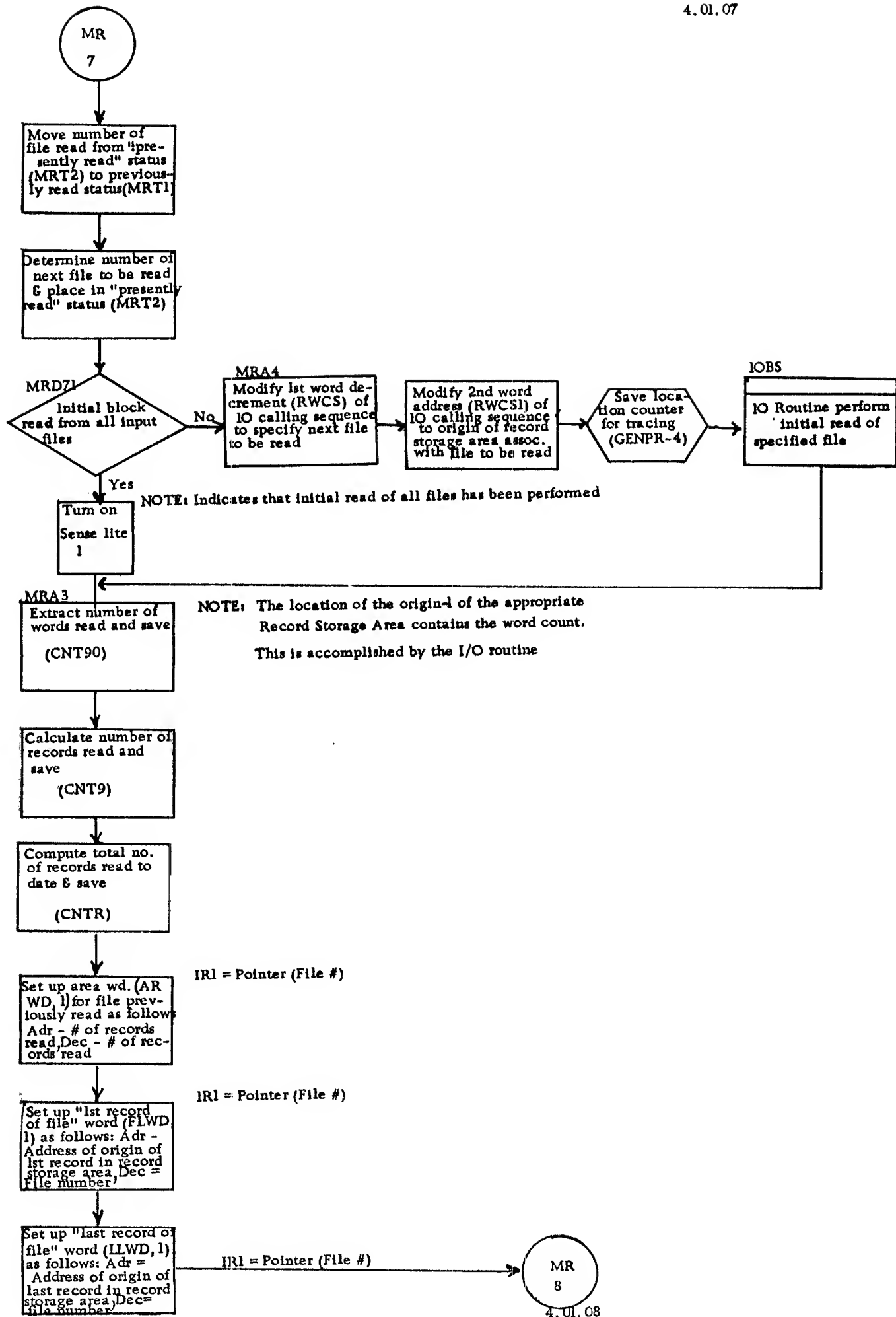


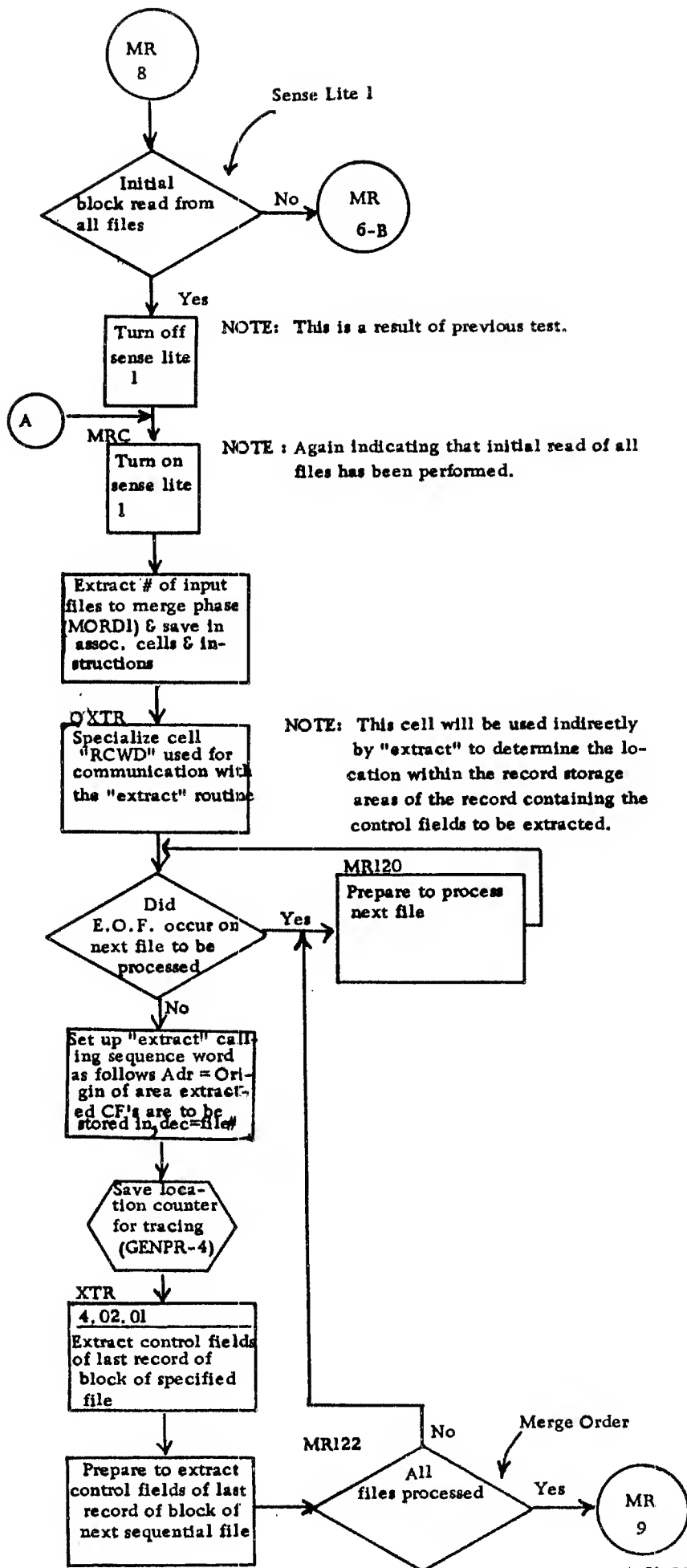


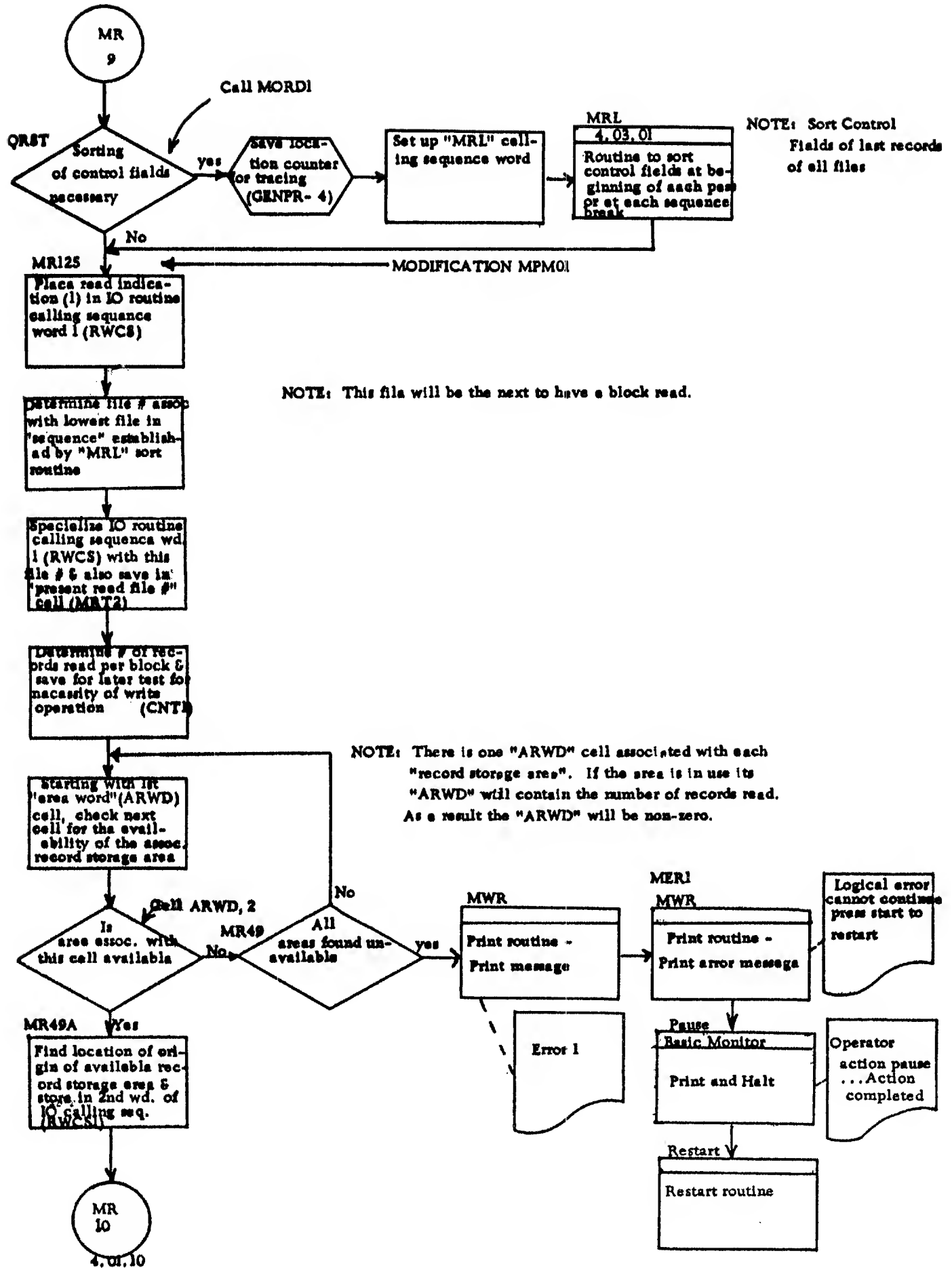




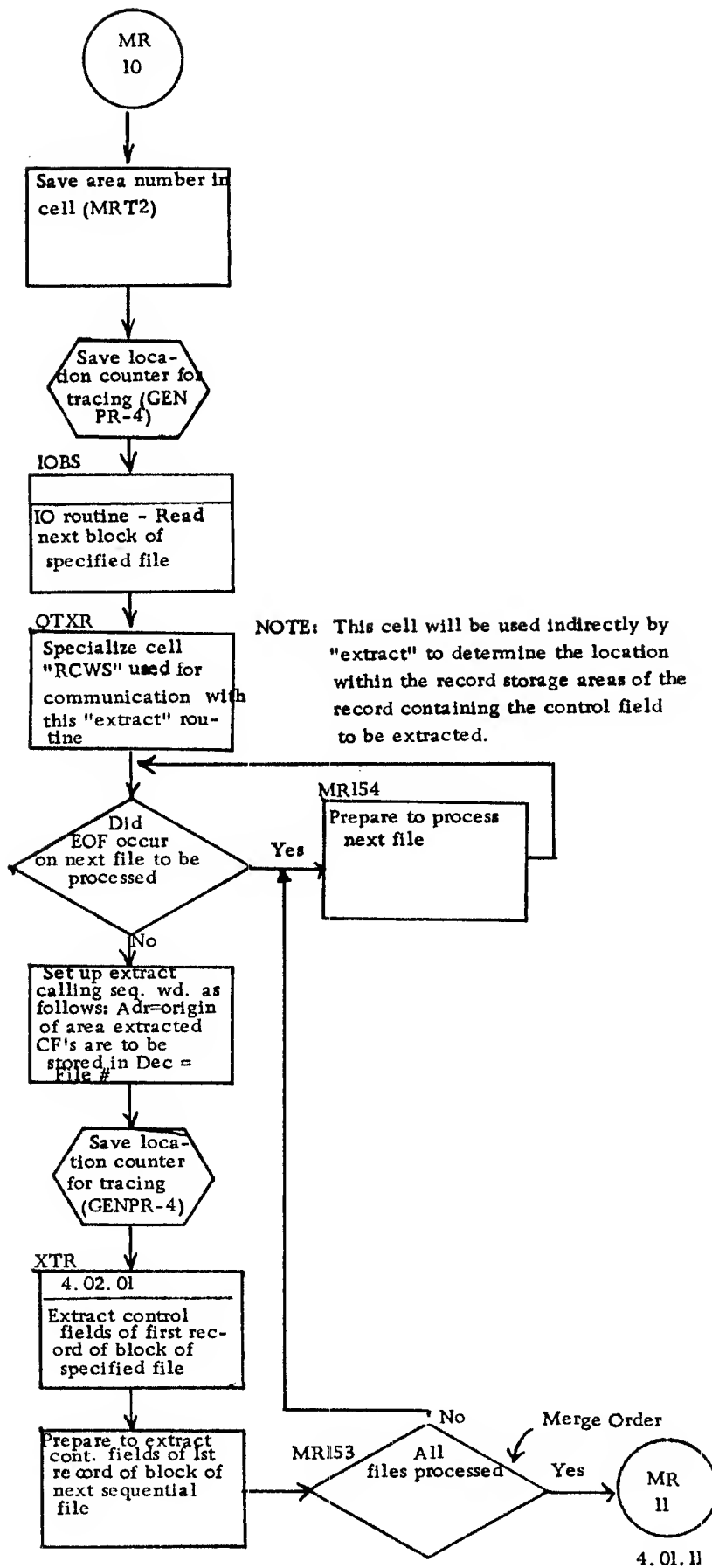


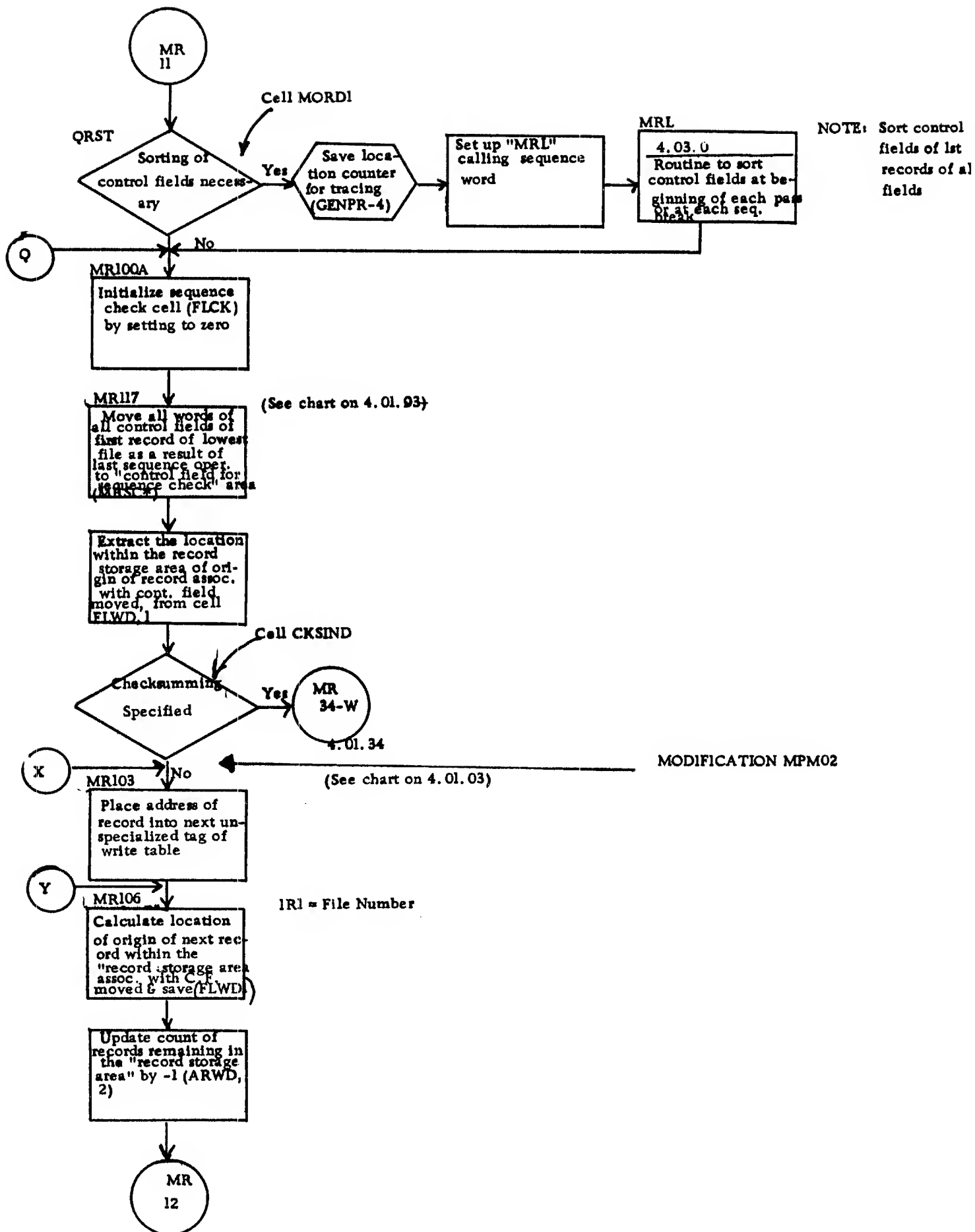


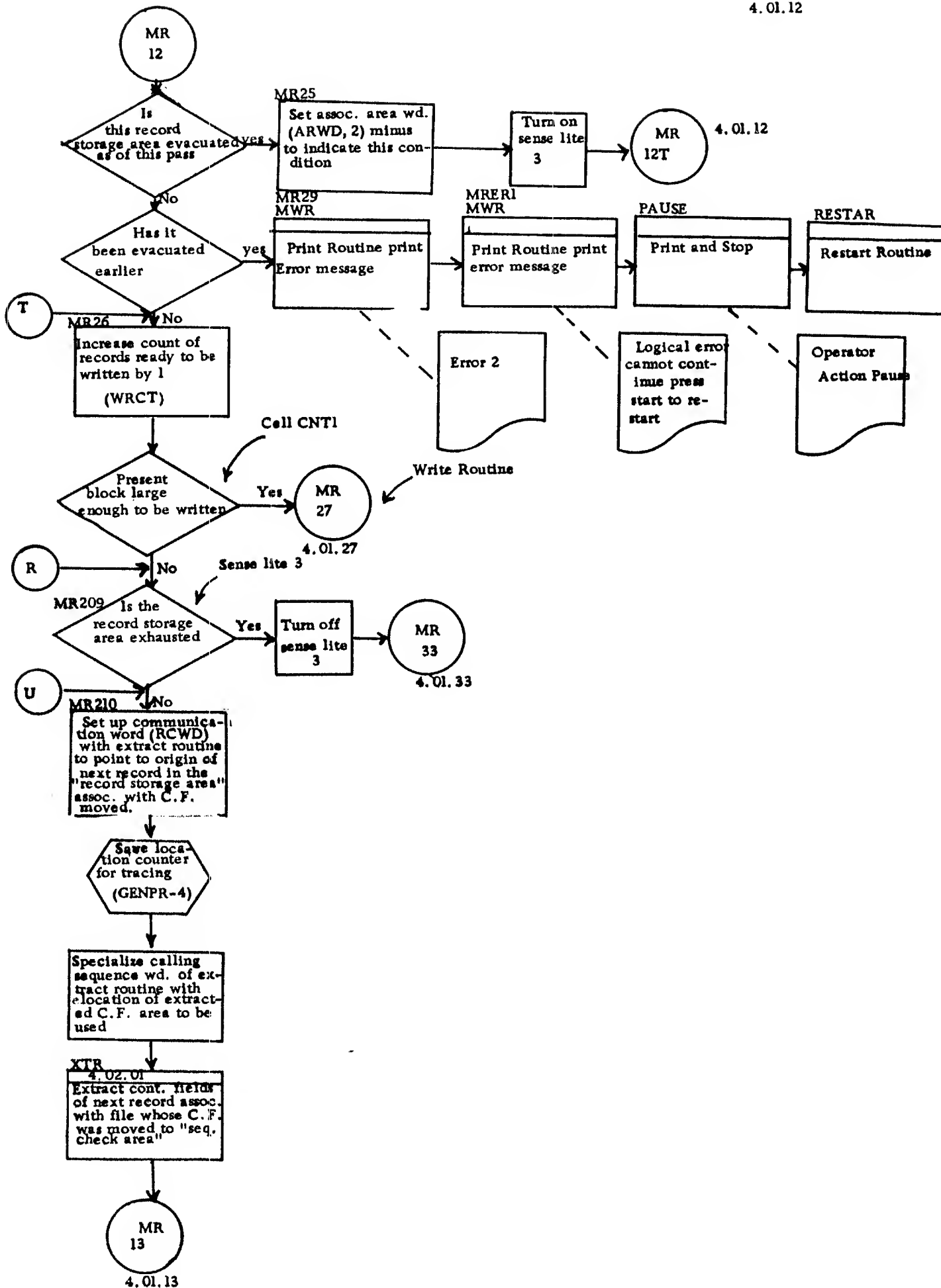


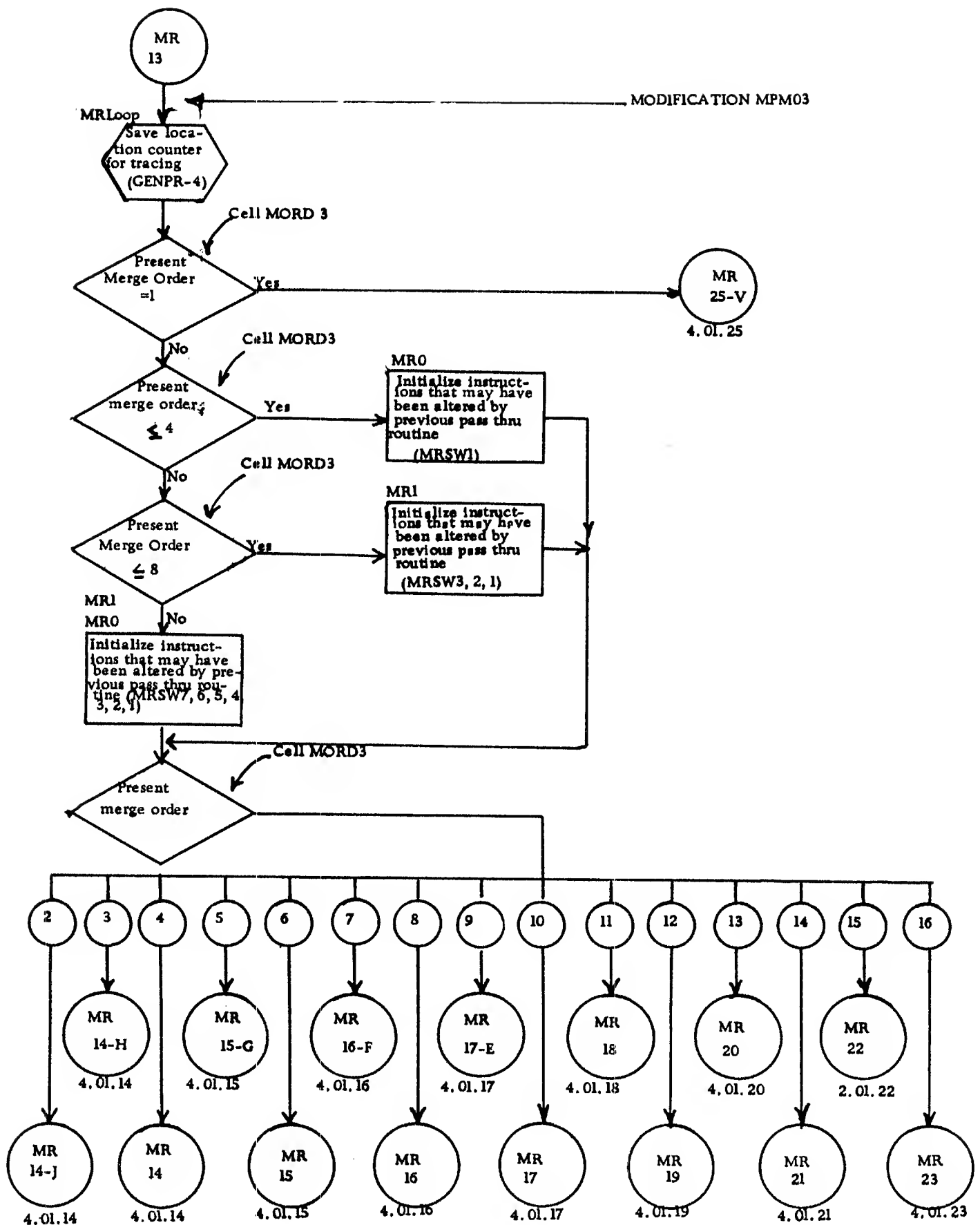


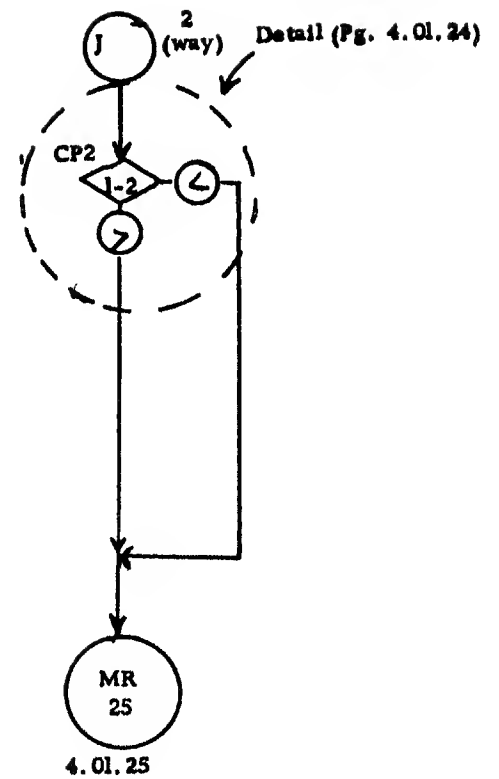
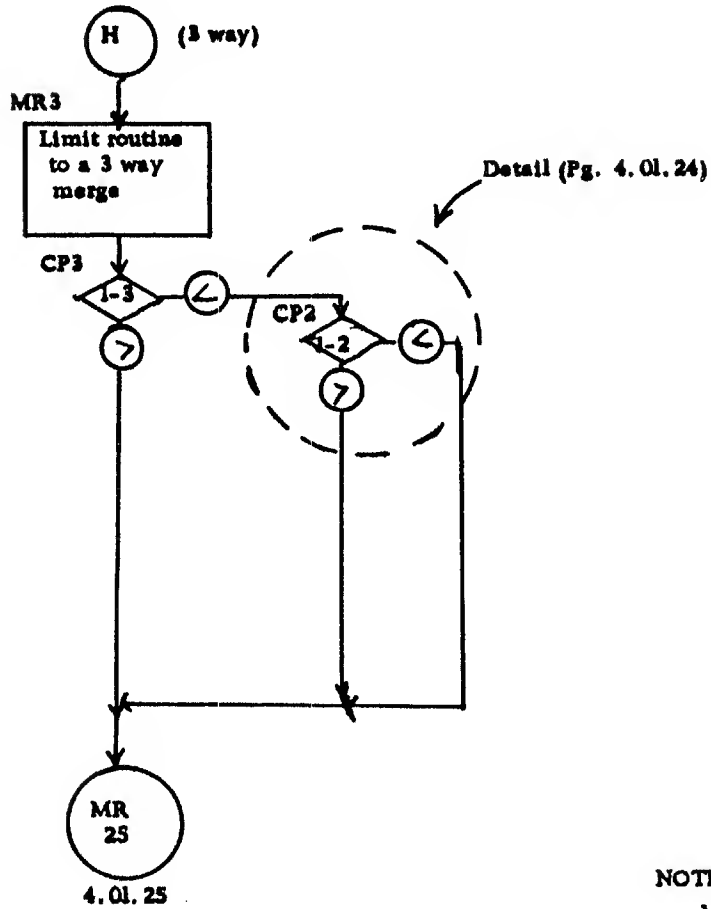
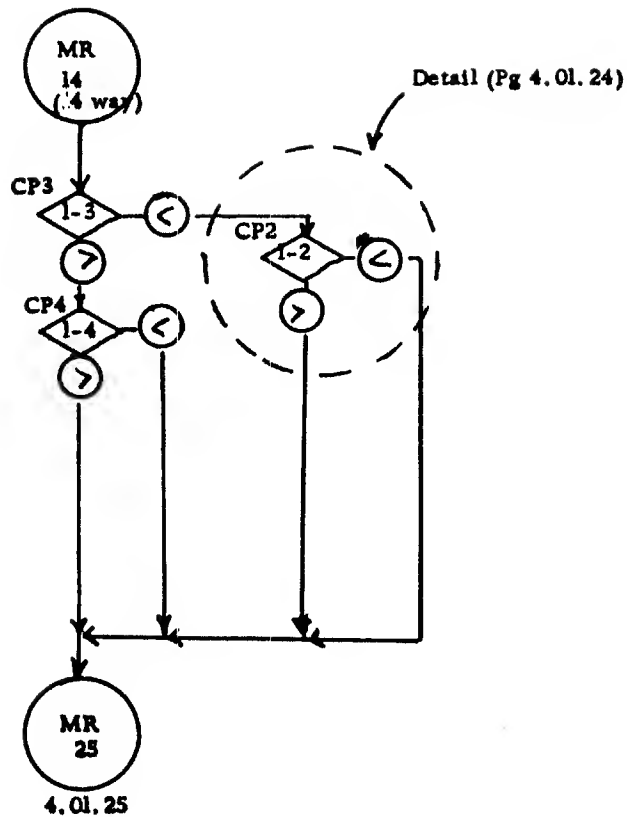






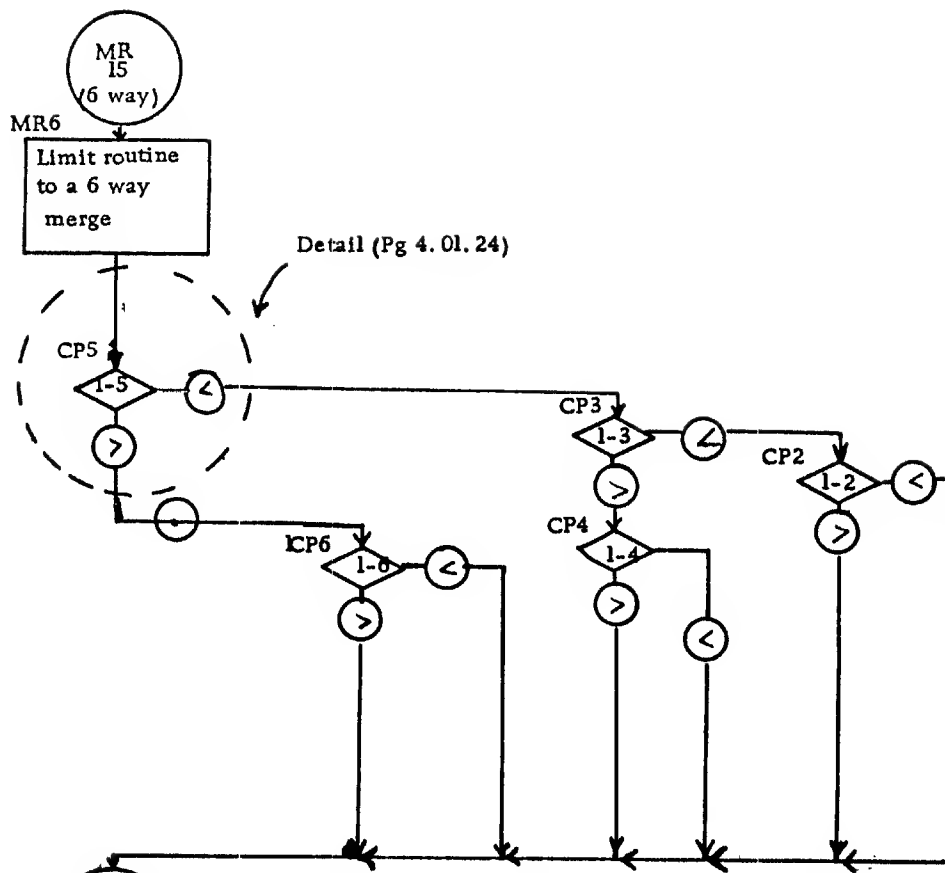






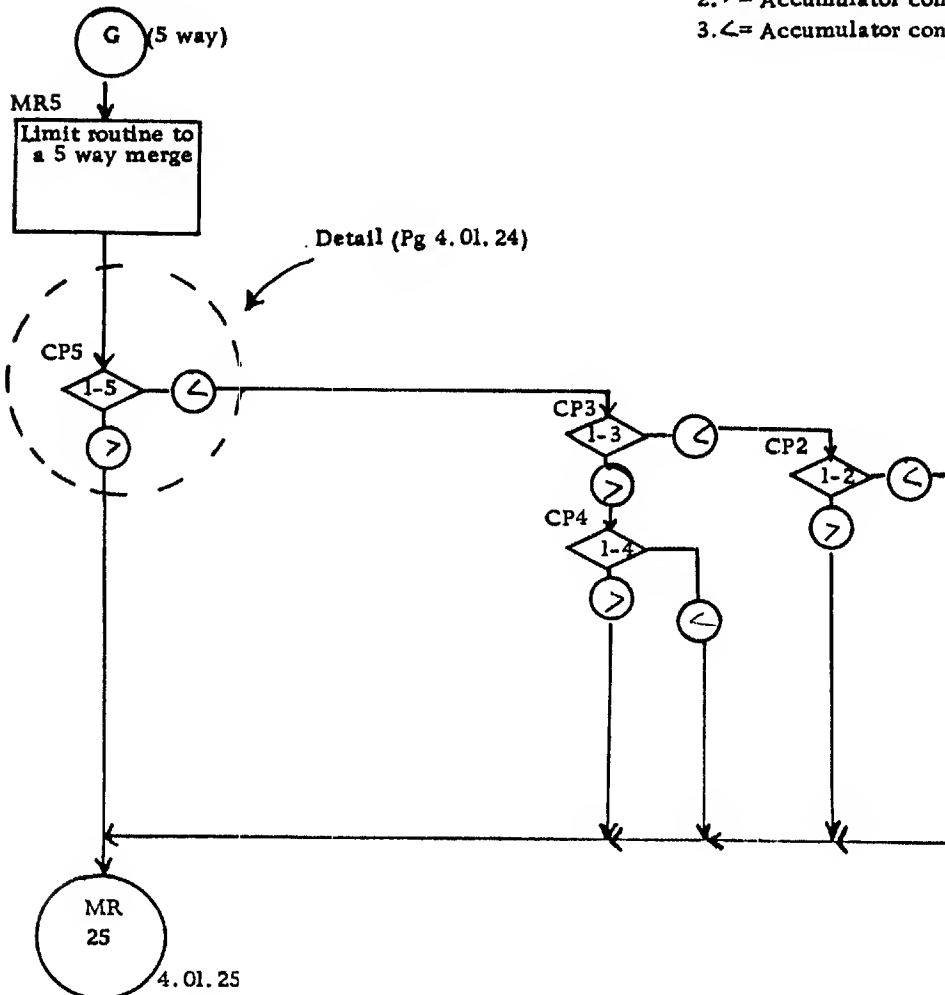
## NOTE:

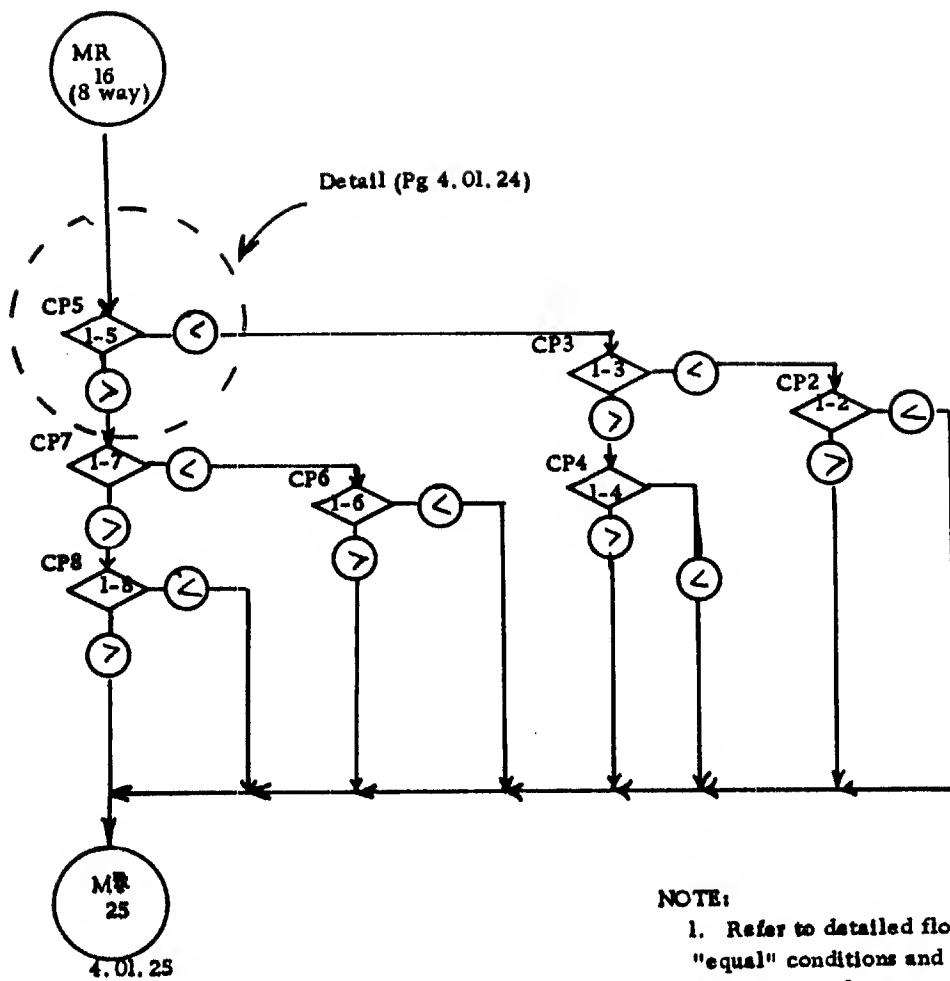
1. Refer to detailed flow chart (4.01.24) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage



## NOTE:

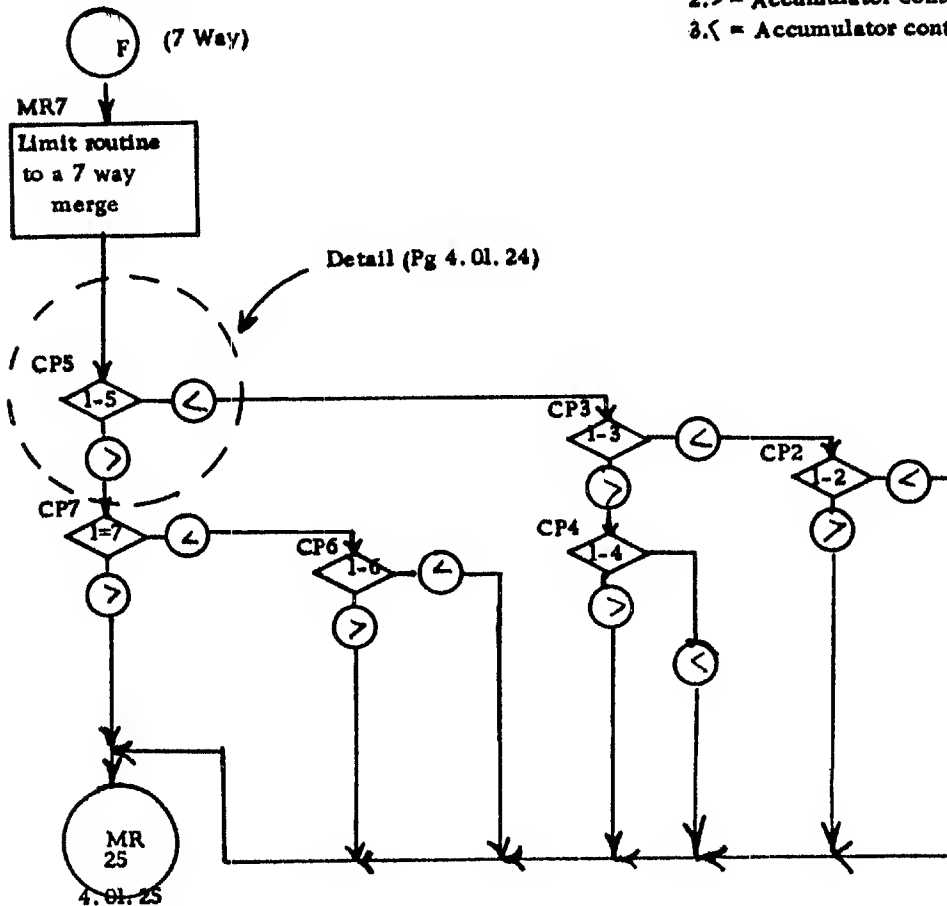
1. Refer to detailed flow chart (4.01. 24) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

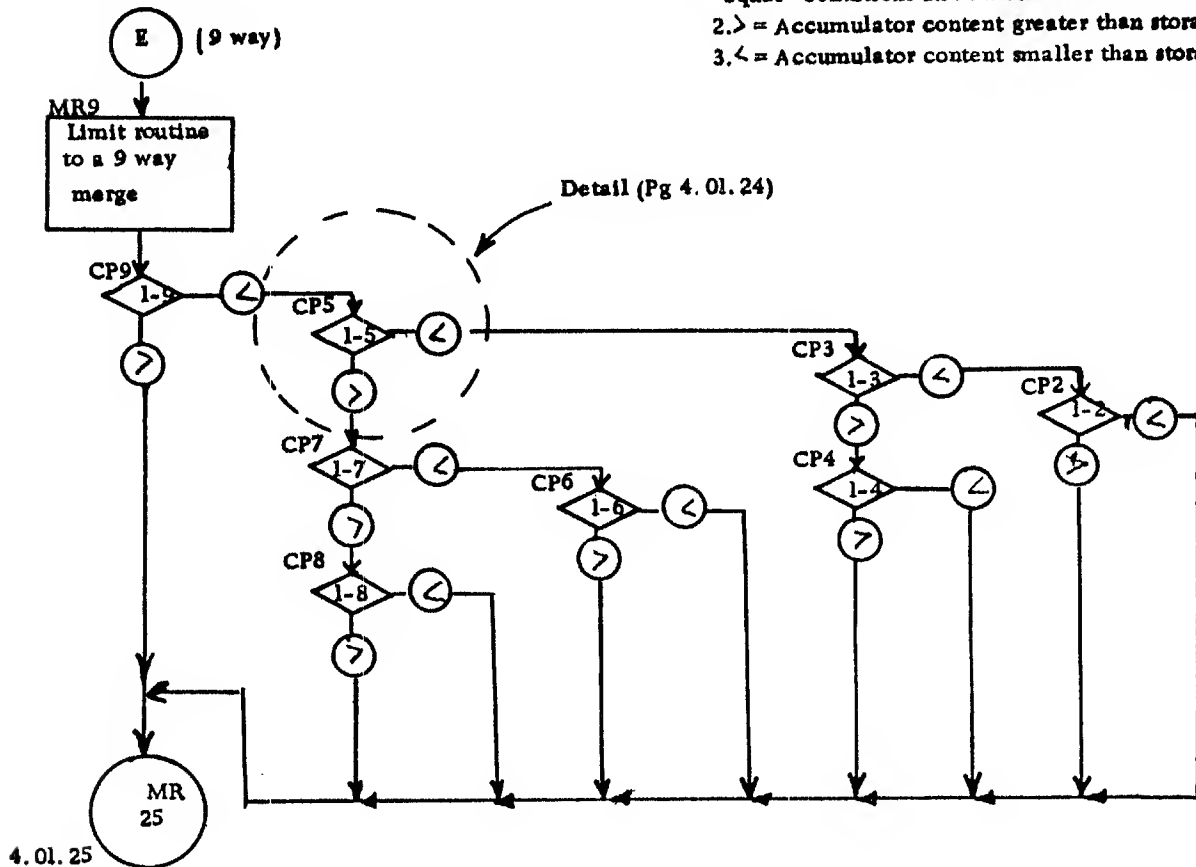
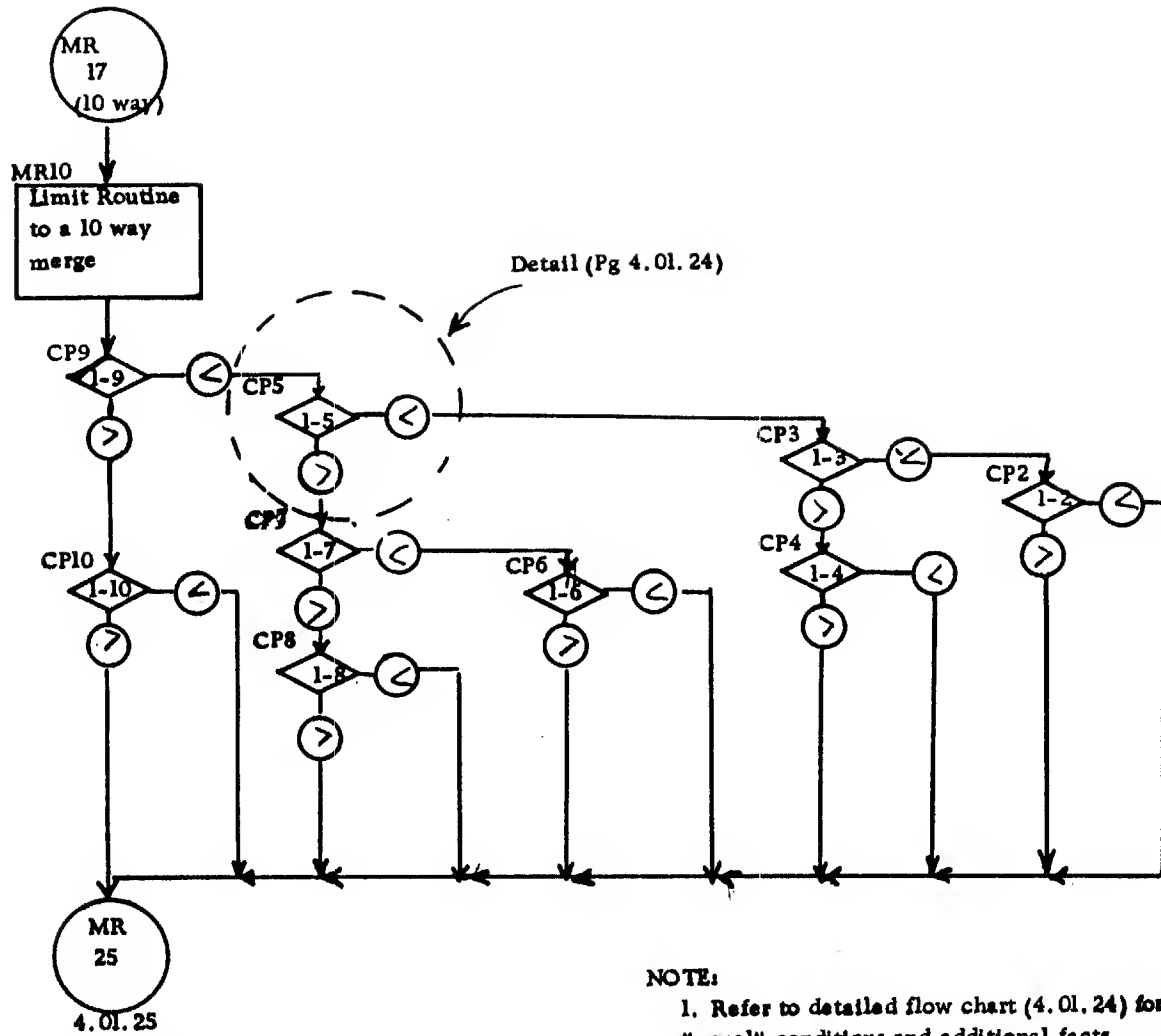




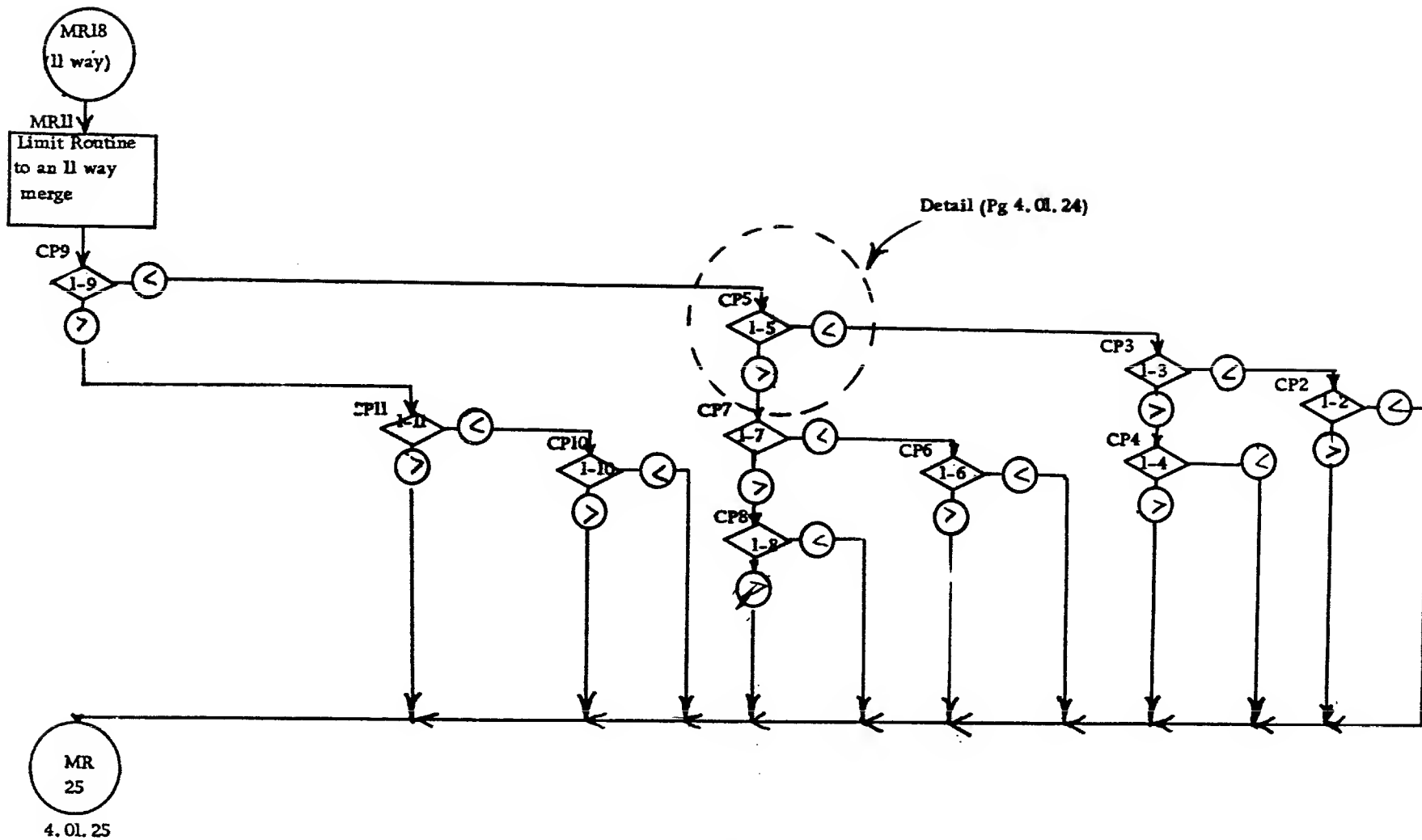
## NOTE:

1. Refer to detailed flow chart (4. 01. 24) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage



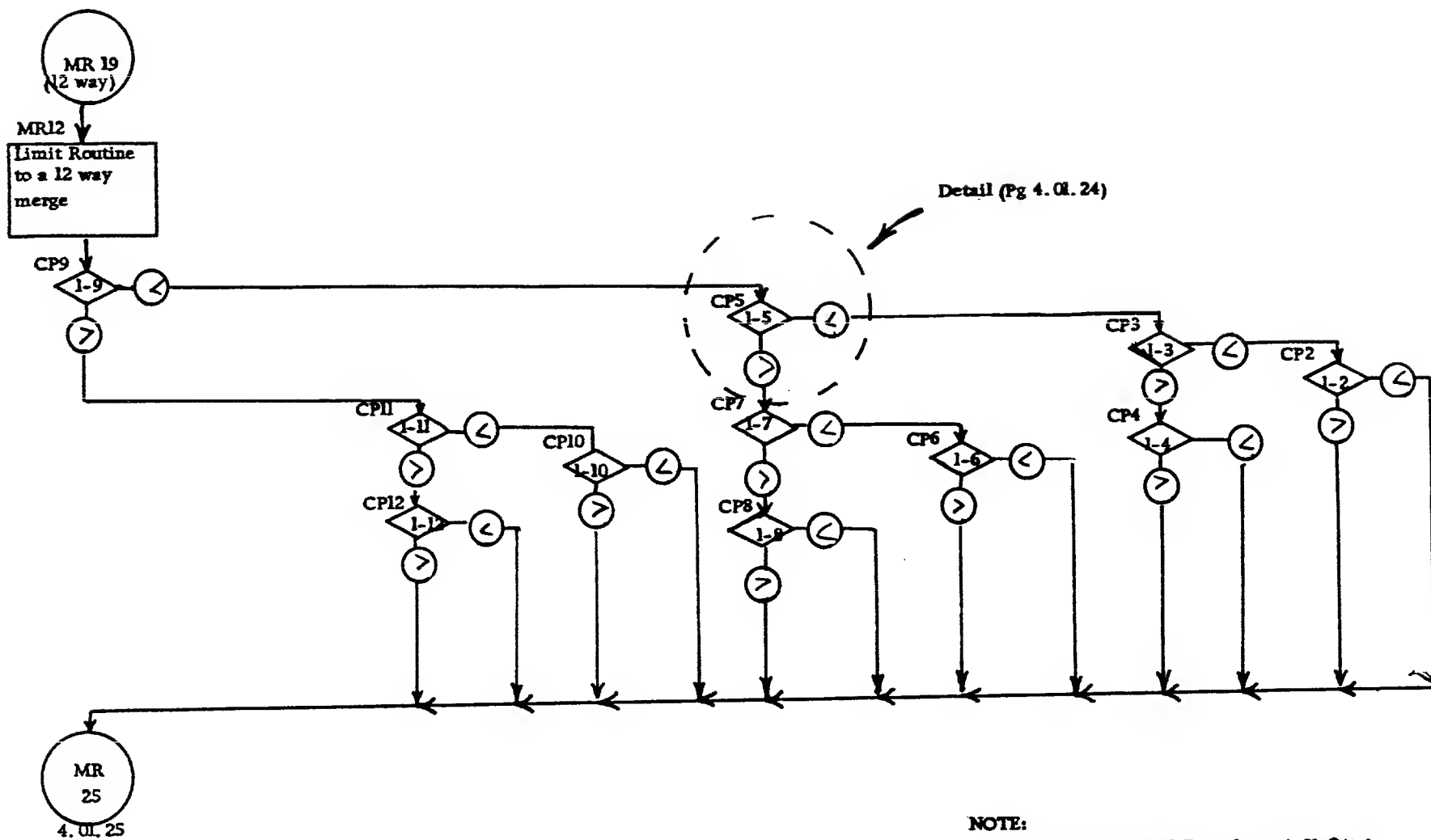






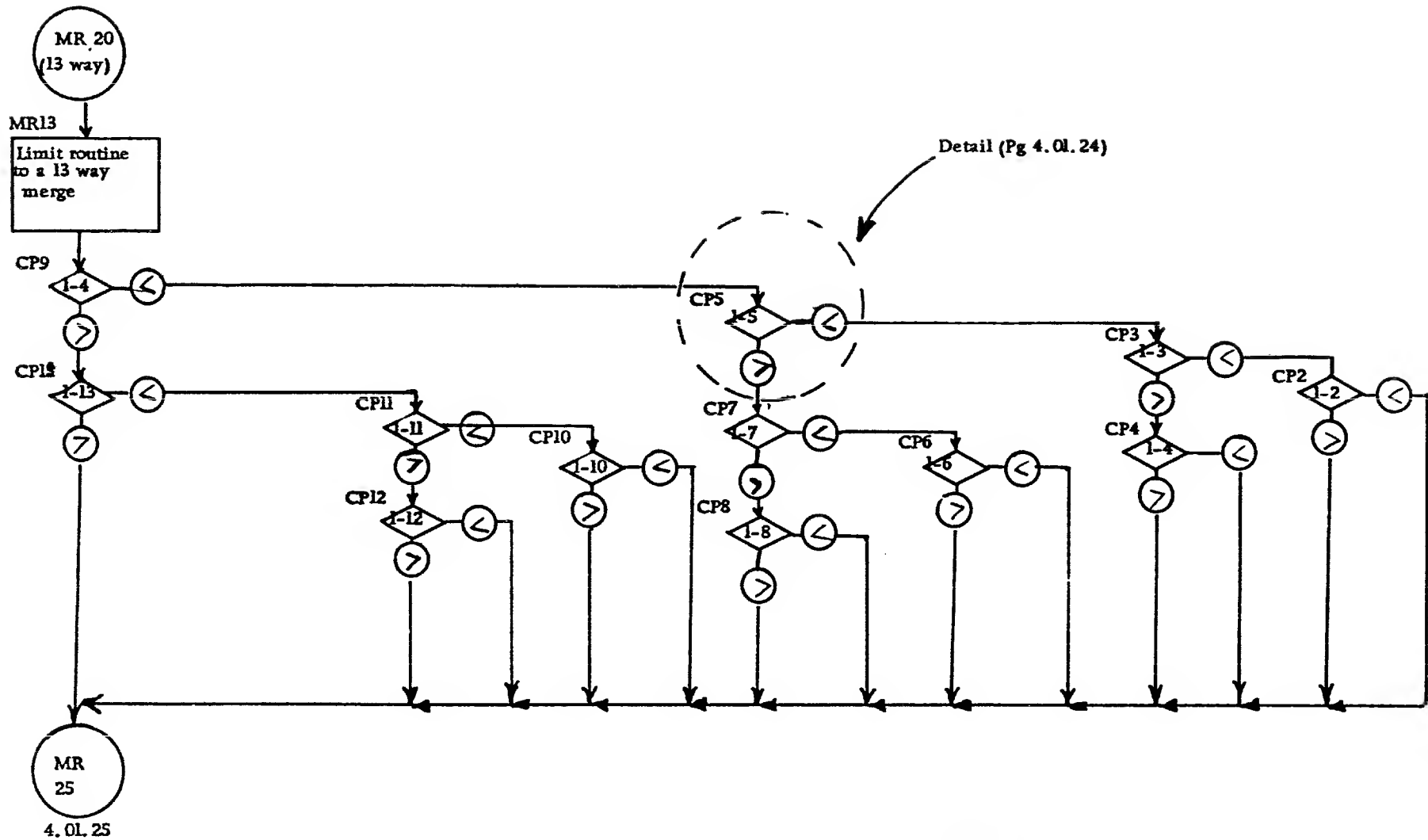
**NOTE:**

1. Refer to detailed flow chart (4.01.24) for "equal" conditions and additional facts
2. > - Accumulator content greater than storage
3. < - Accumulator content smaller than storage



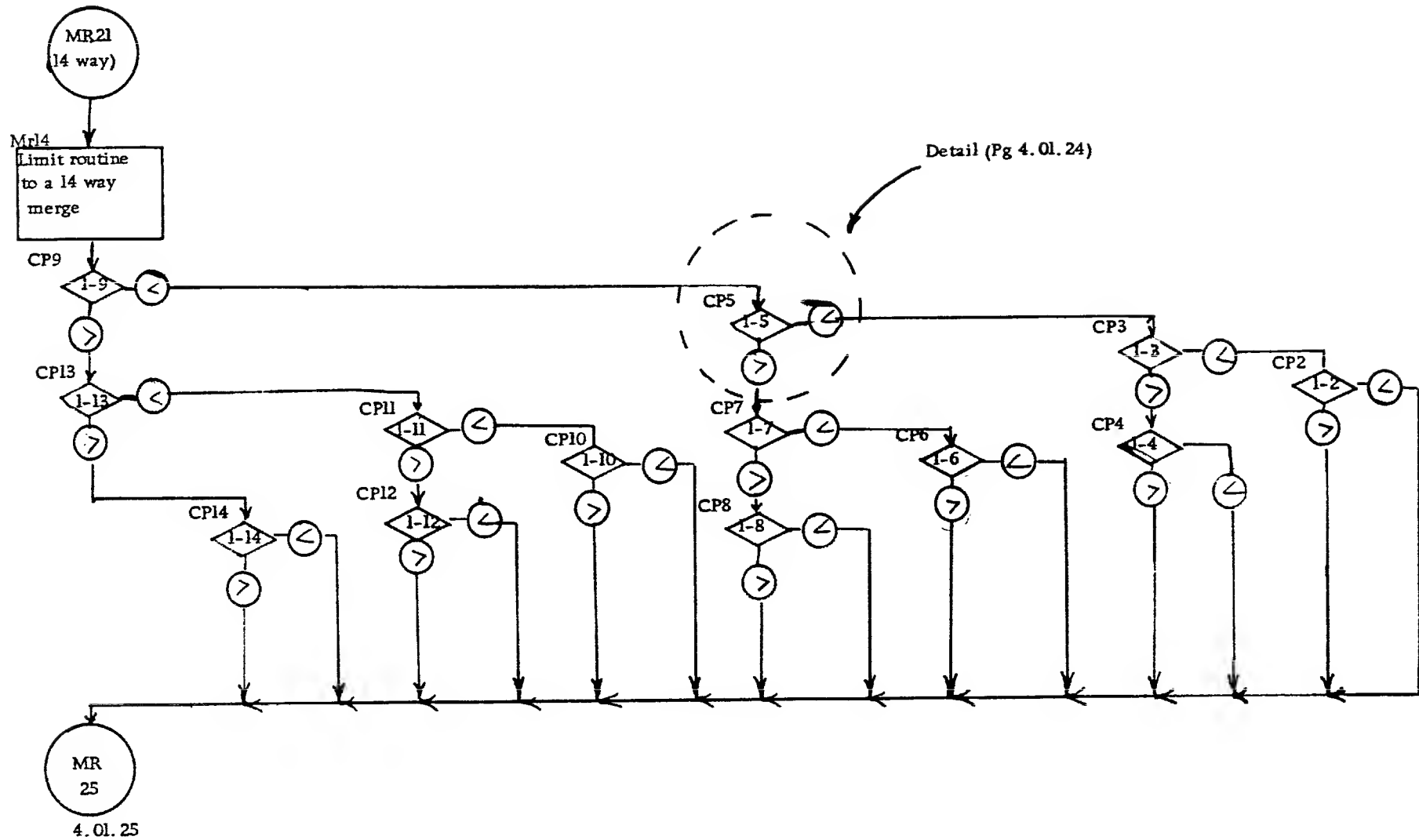
**NOTE:**

1. Refer to detailed flow chart (4.01.24) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage



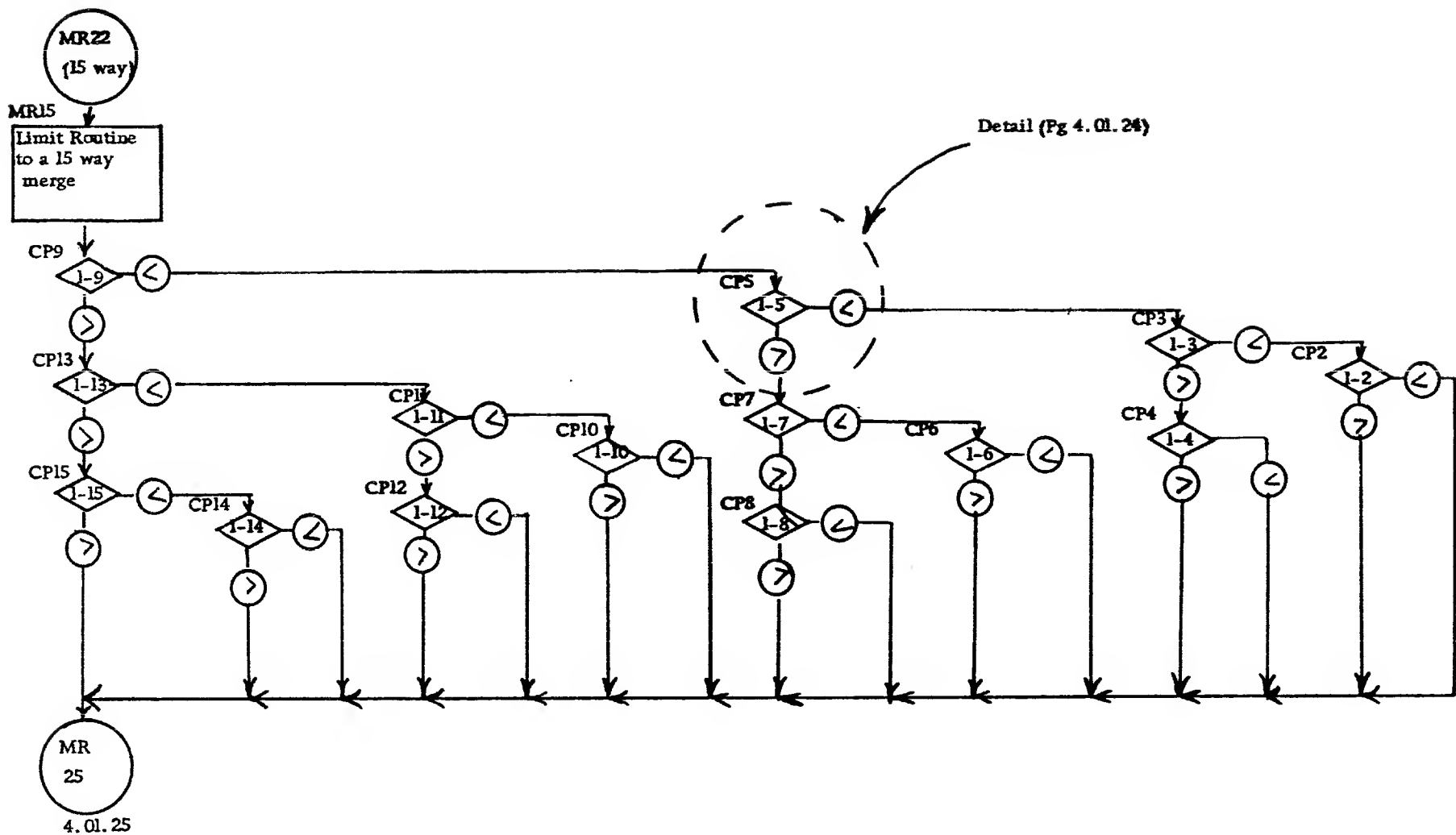
**NOTE:**

1. Refer to detailed flow chart (4. OL. 24) for "equal" conditions and additional facts
2. > = accumulator content greater than storage
3. < = accumulator content smaller than storage



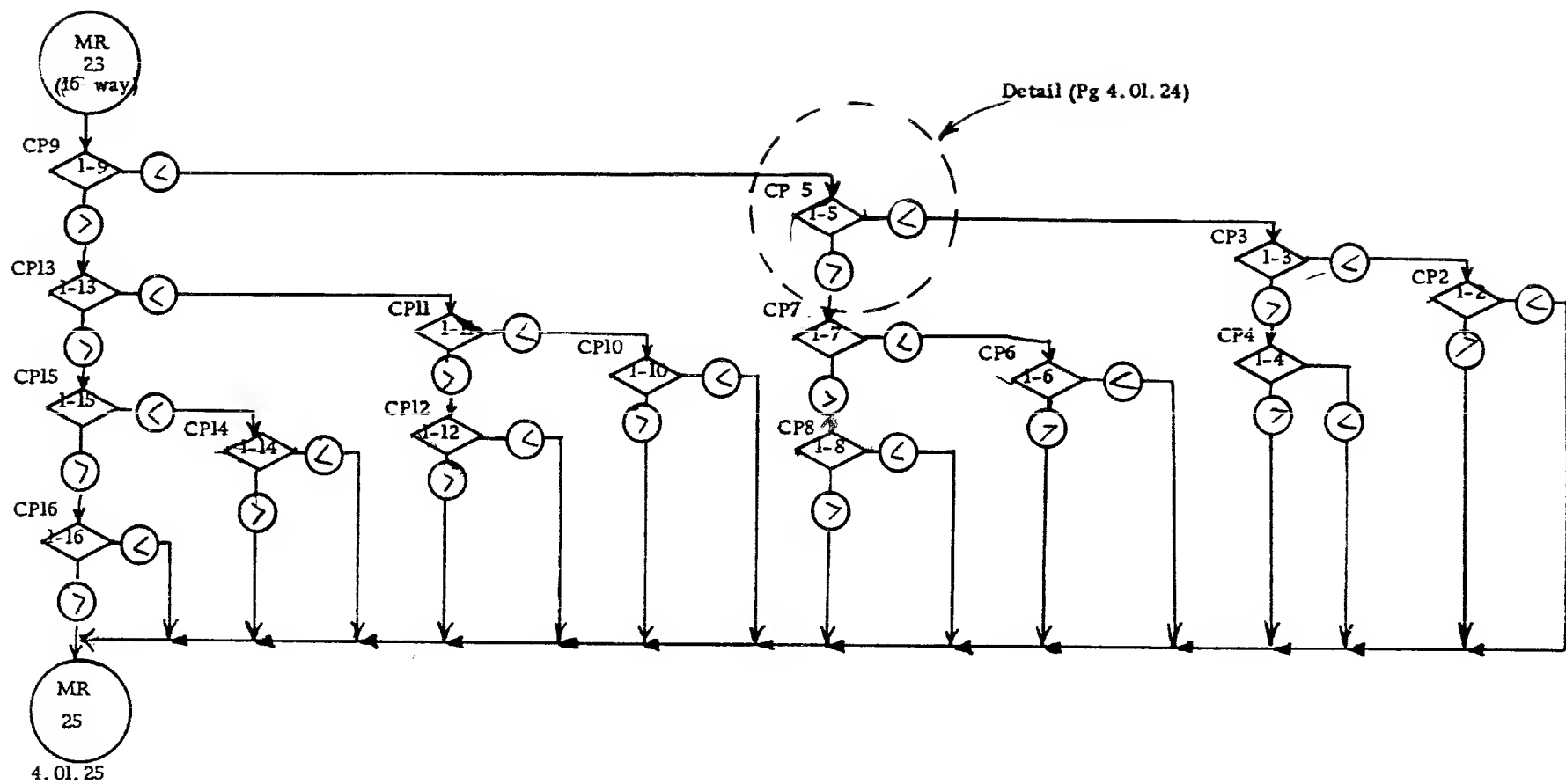
**NOTE:**

1. Refer to detailed flow chart (4. Ol. 24) for (equal) conditions and additional facts
2. >= Accumulator content greater than storage
3. <= Accumulator content smaller than storage



**NOTE:**

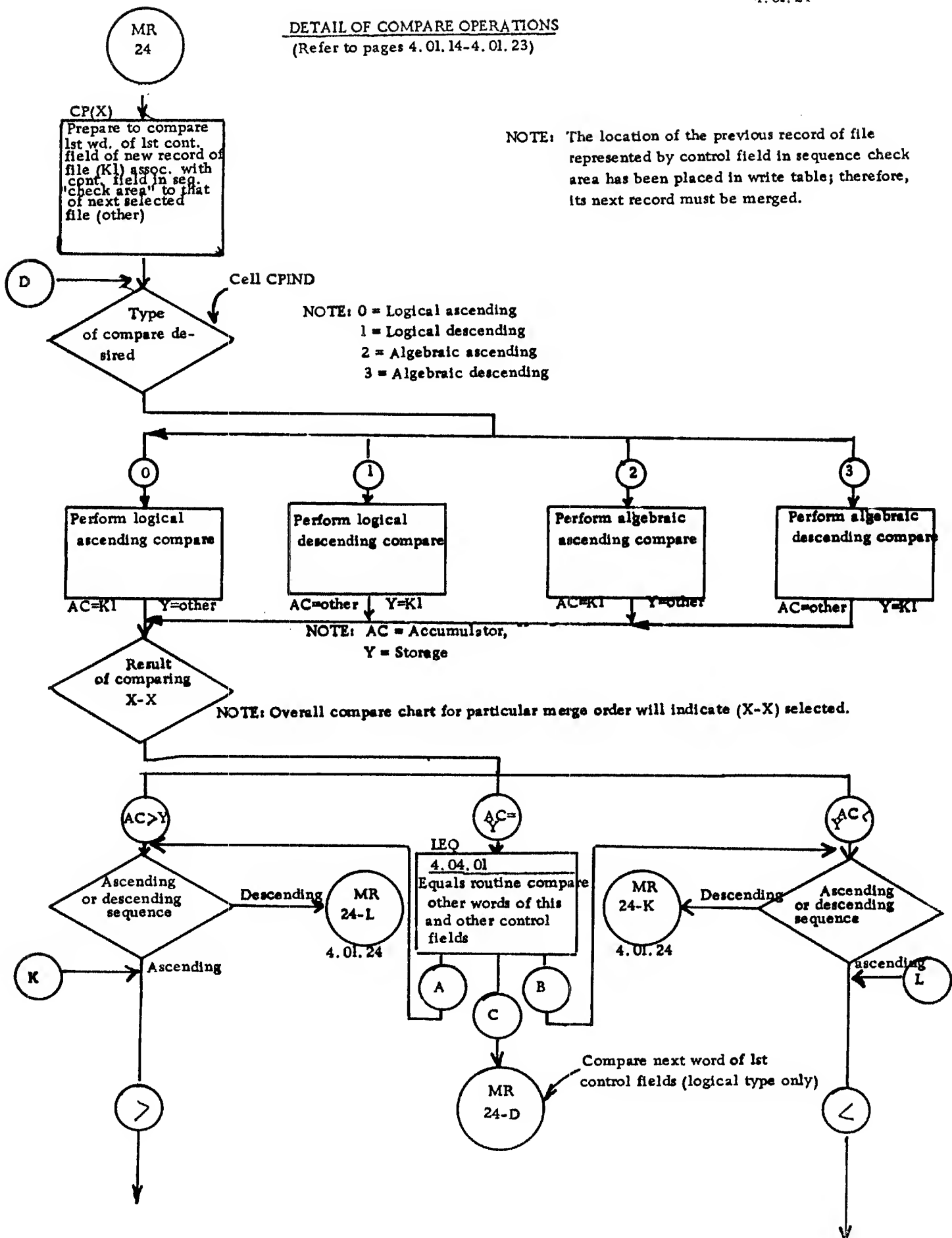
1. Refer to detailed flow chart (4.01.24) for "equal" conditions & additional facts
2. >= Accumulator content greater than storage
3. <= Accumulator content smaller than storage

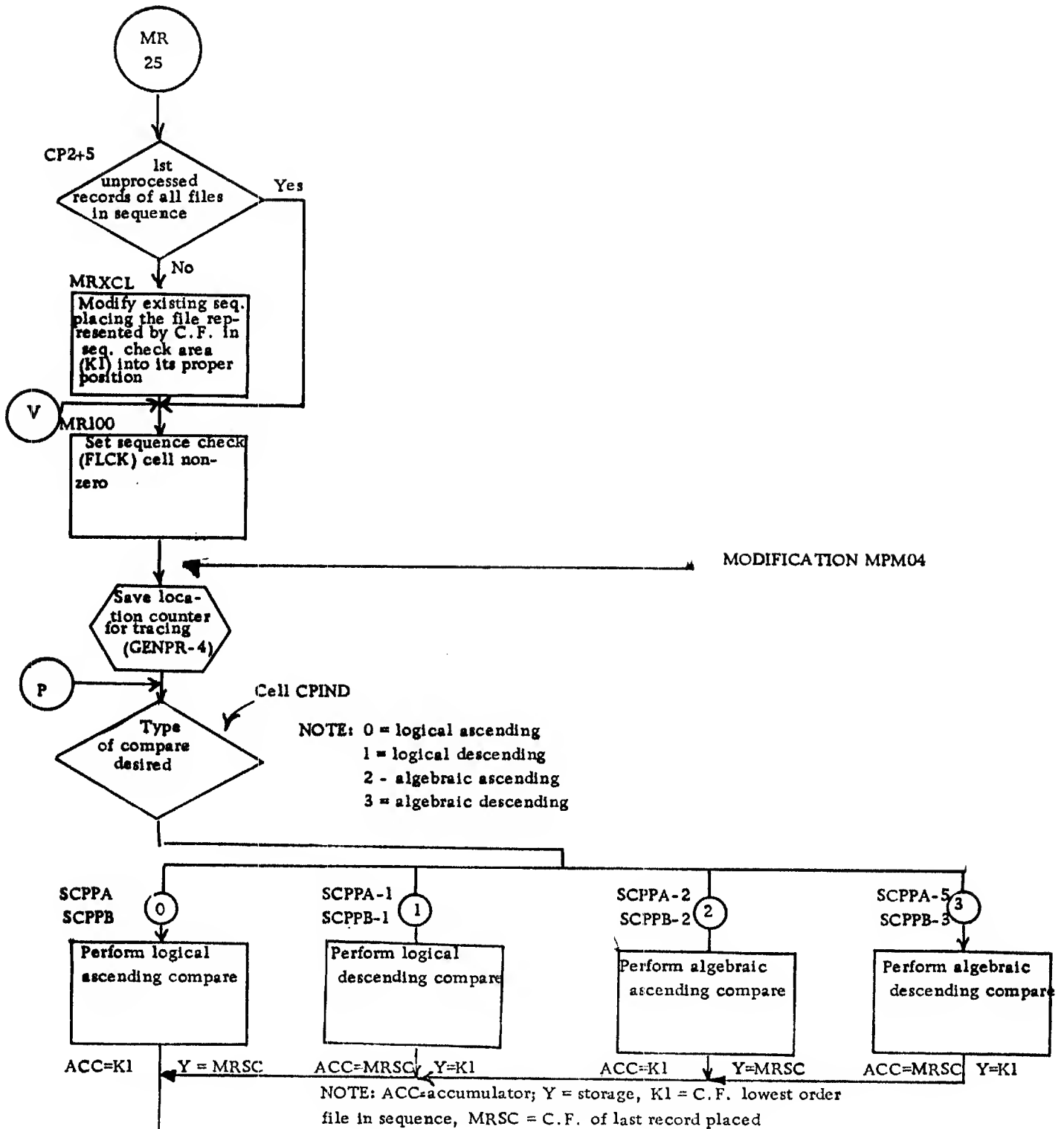


NOTE:

1. Refer to detailed flow chart (4. 01. 24) for "equal" conditions and additional facts.
2. > = accumulator content greater than storage
3. < = accumulator content smaller than storage

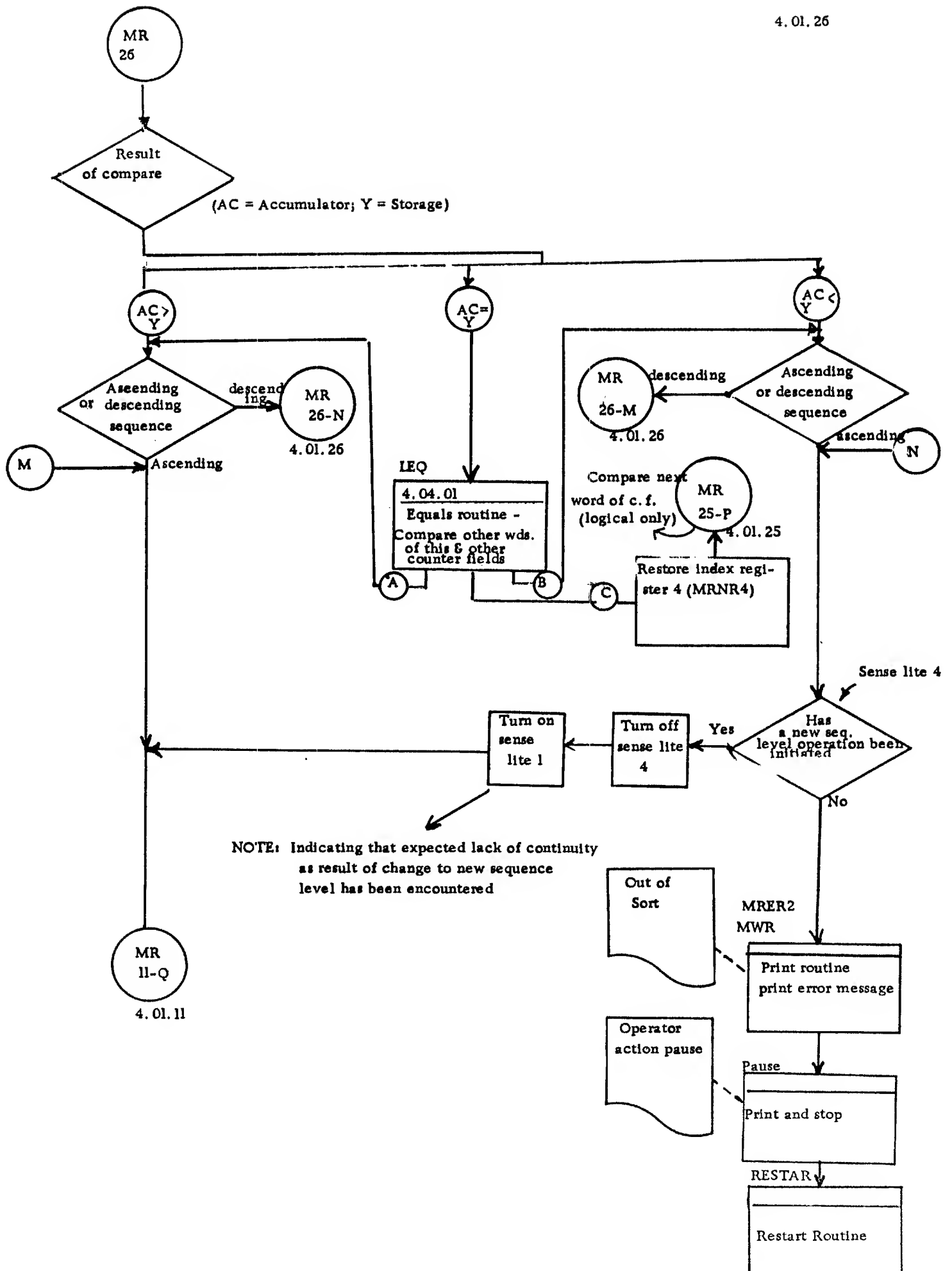
DETAIL OF COMPARE OPERATIONS  
(Refer to pages 4.01.14-4.01.23)



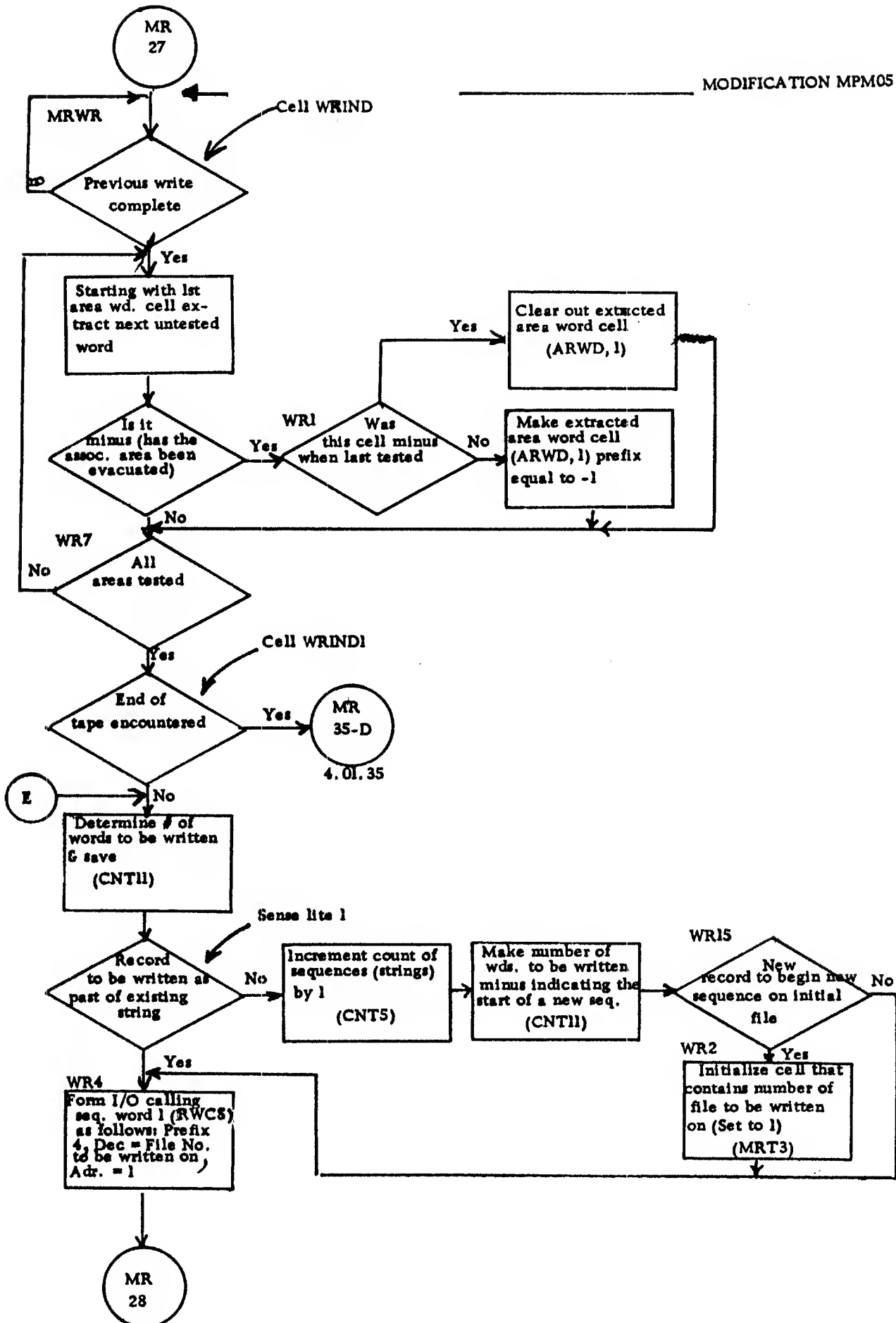


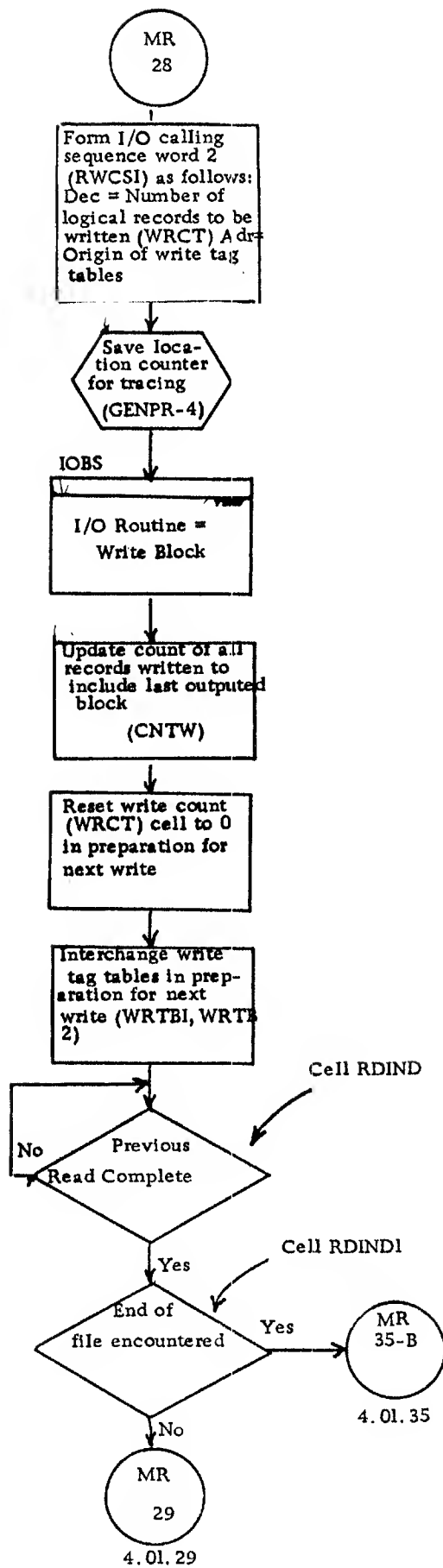
NOTE: Comparing to see if next low record will fall into same output sequence (string)

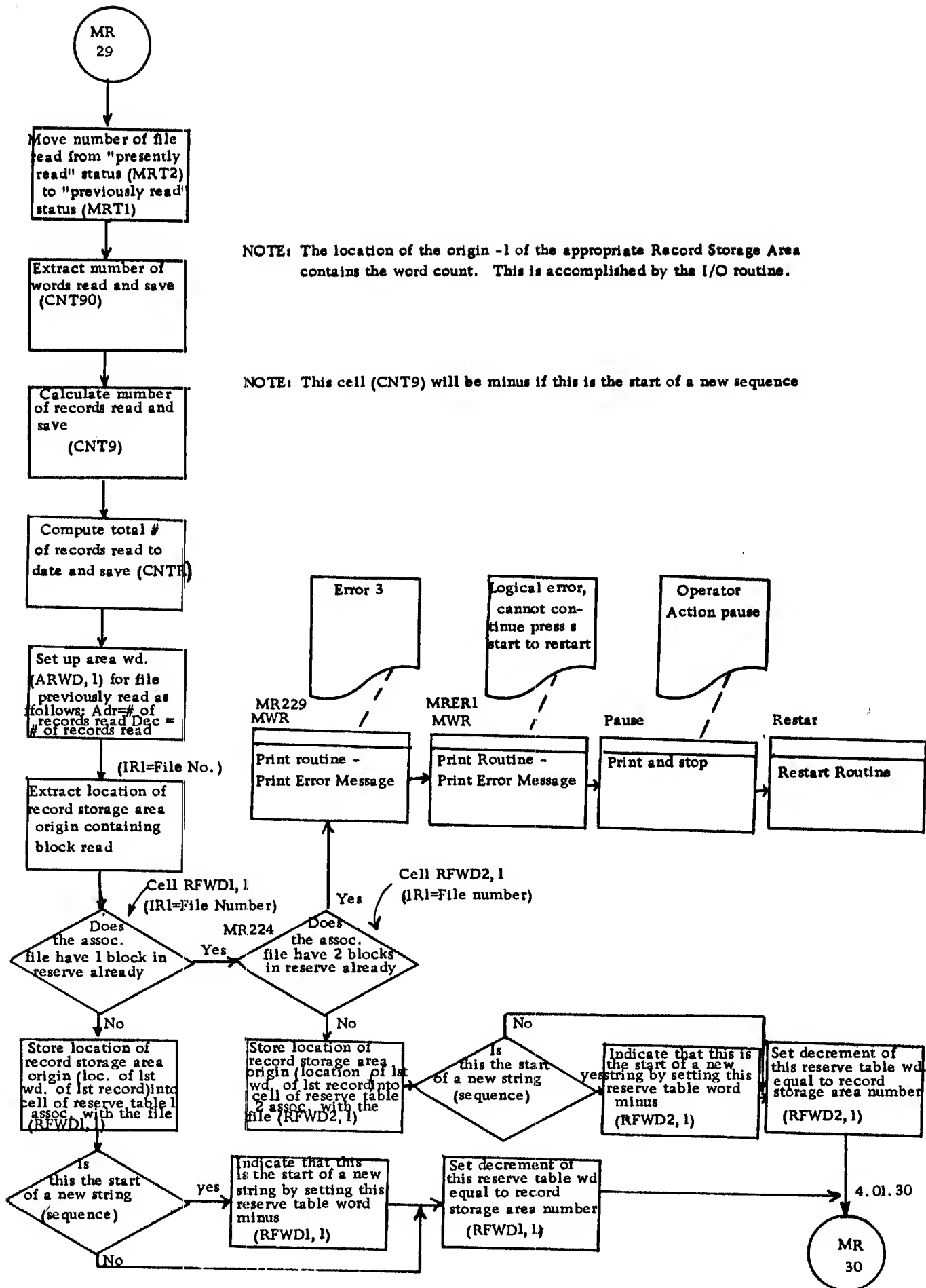


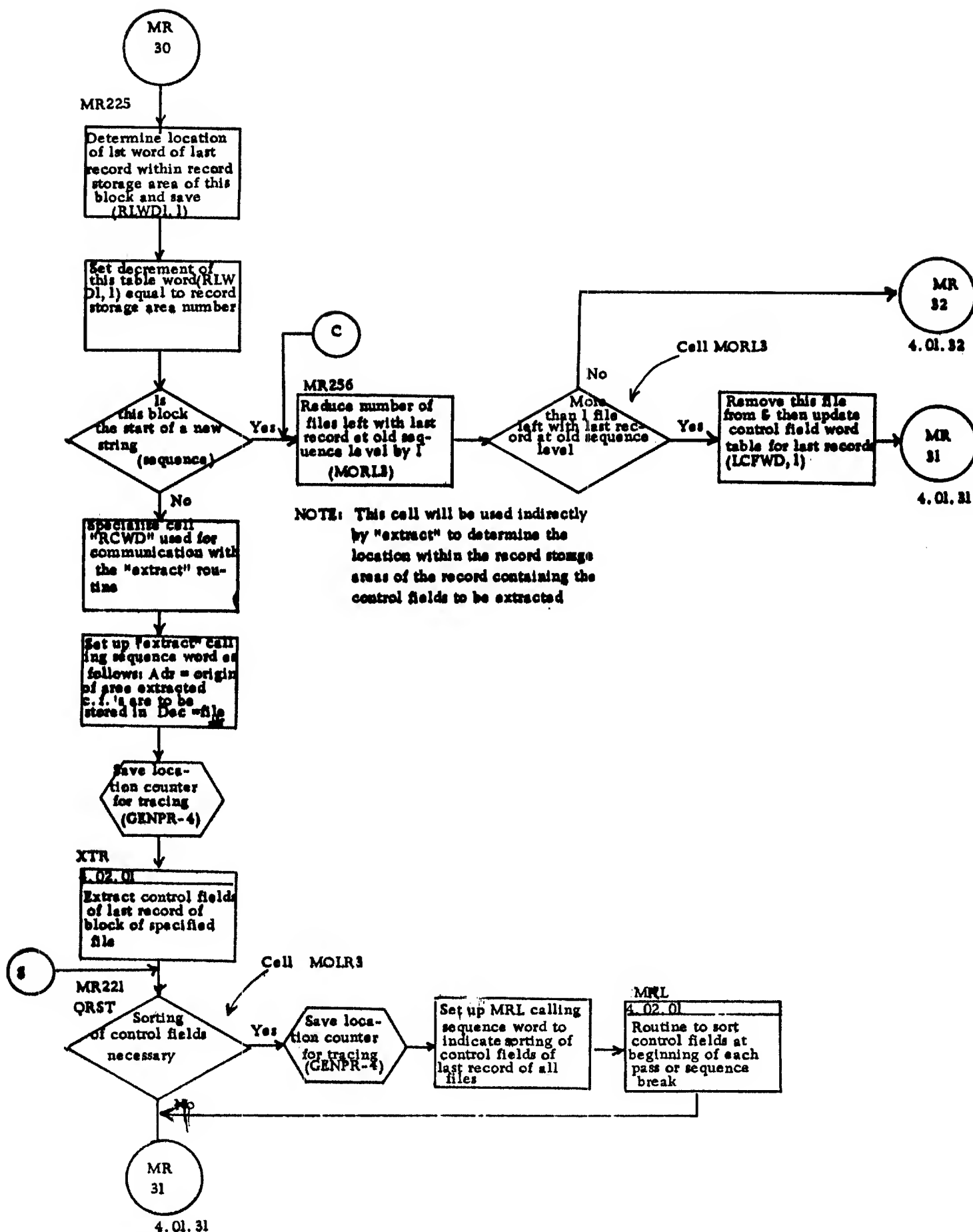


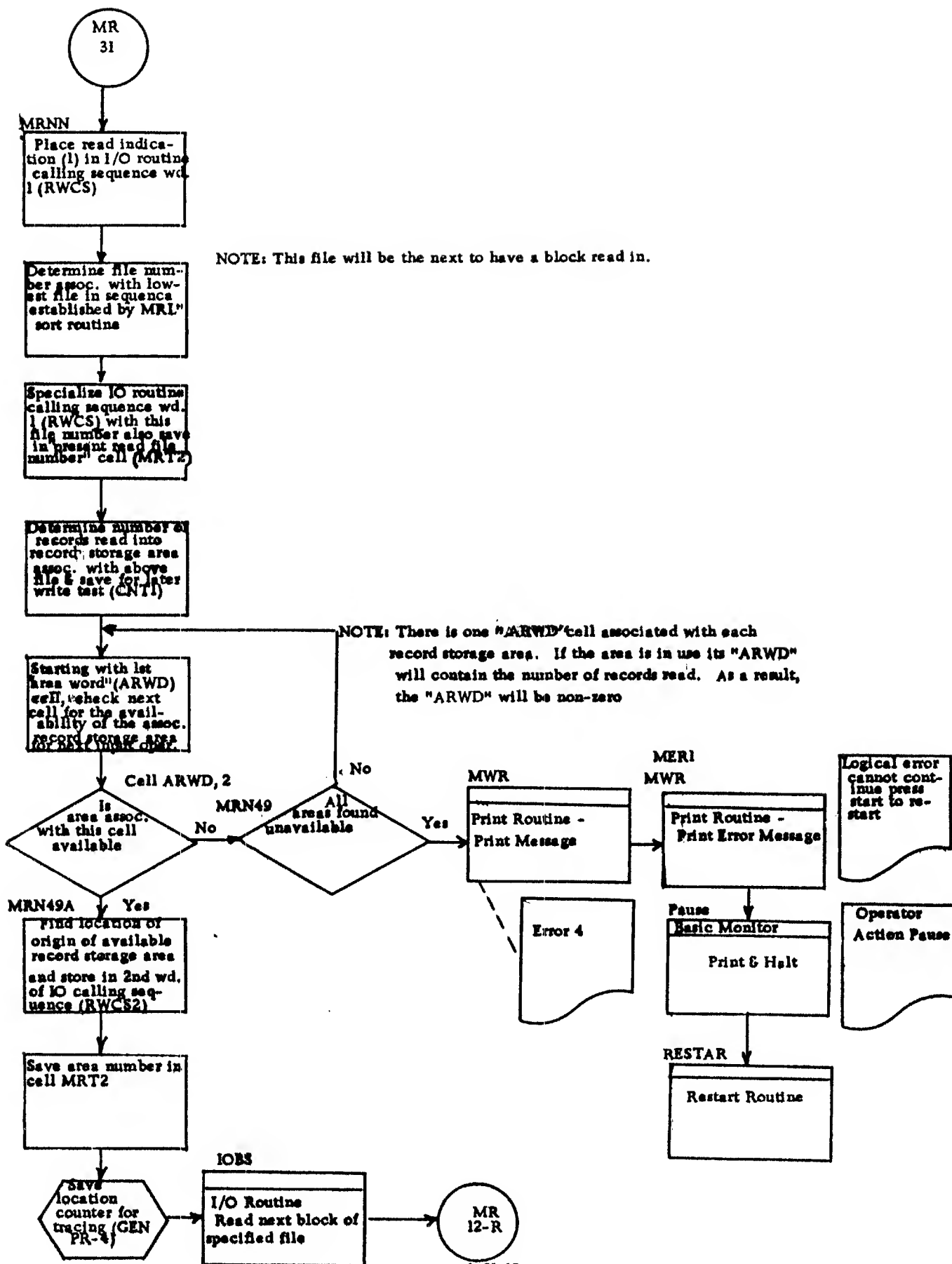
MODIFICATION MPM05

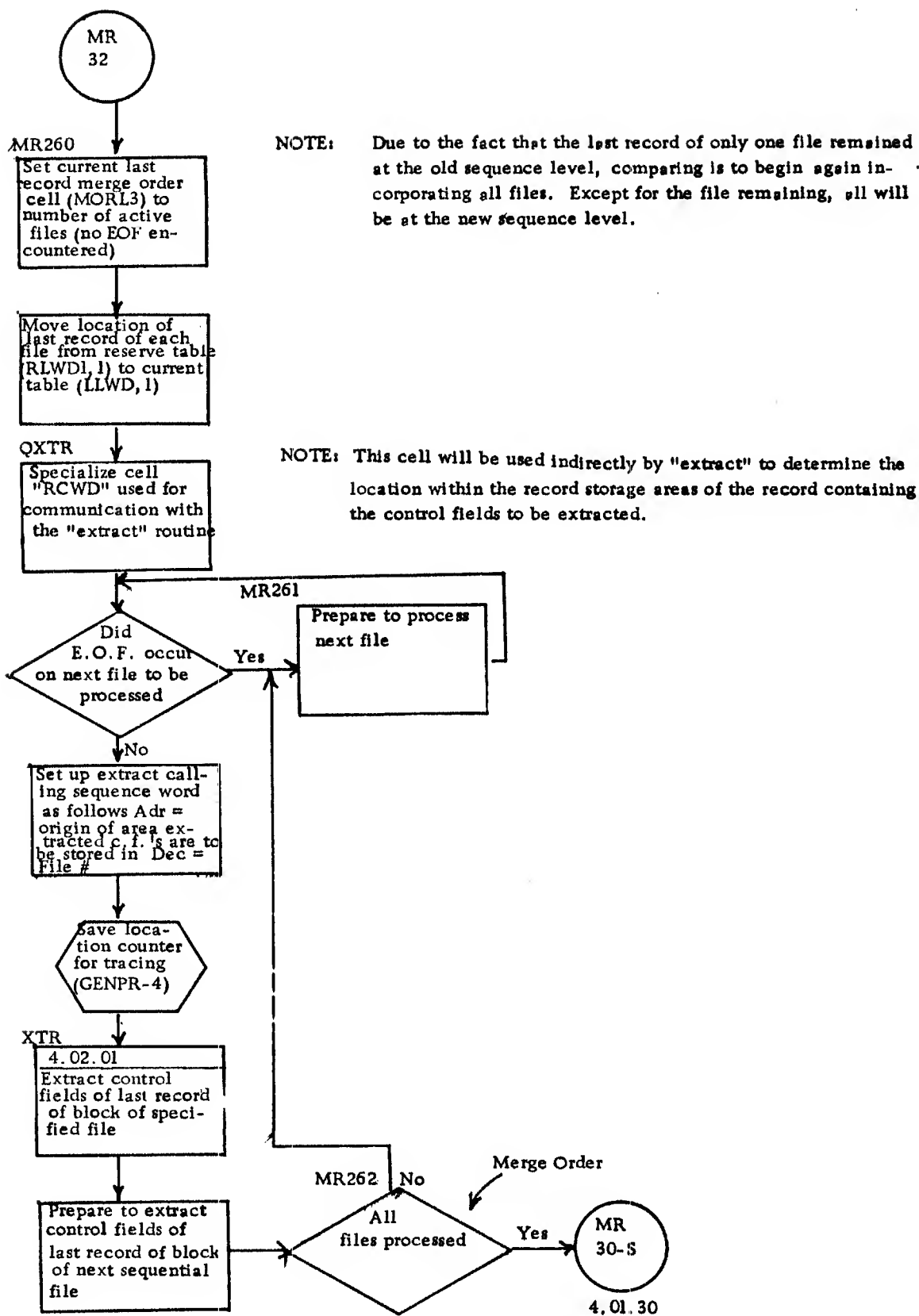


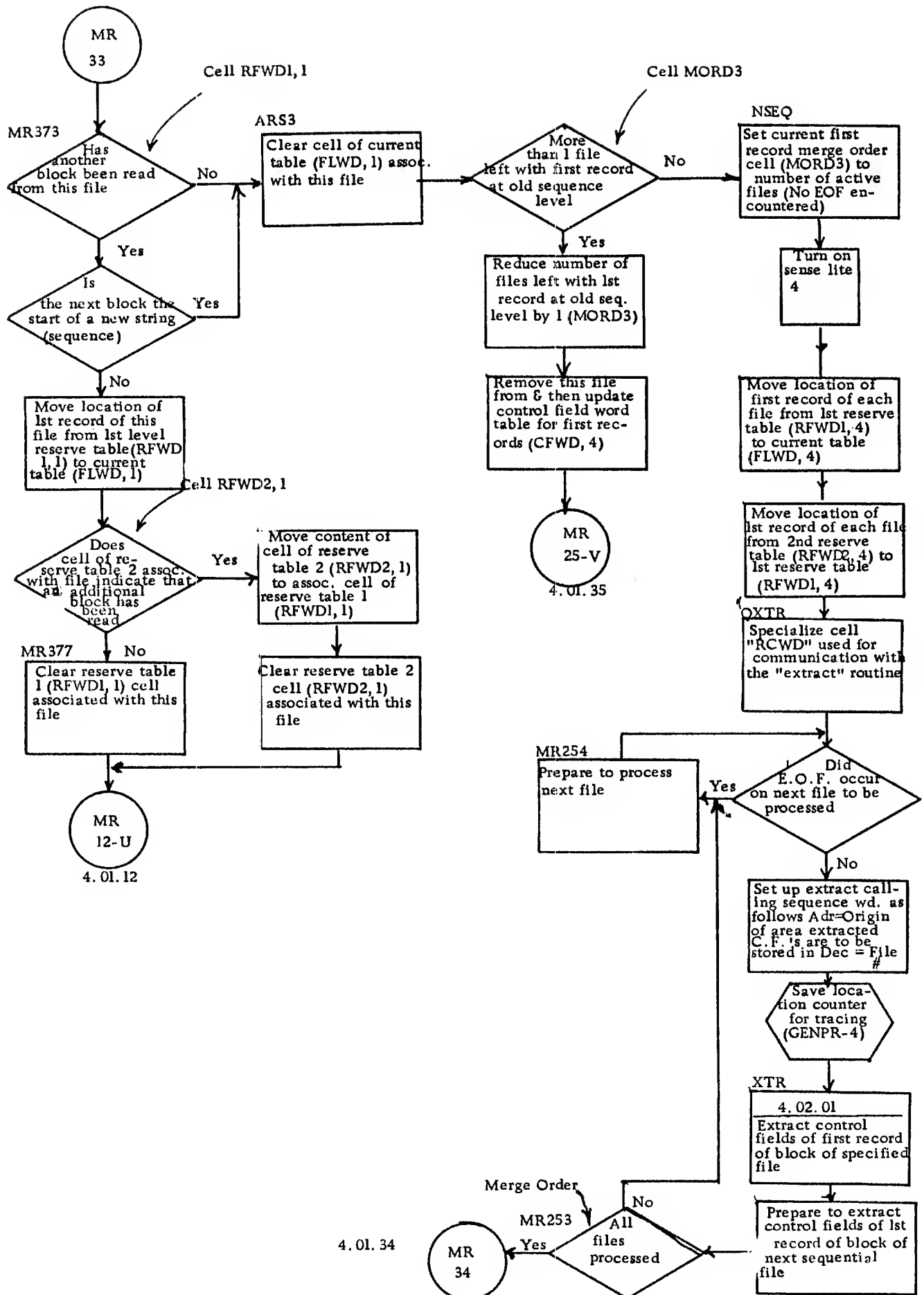




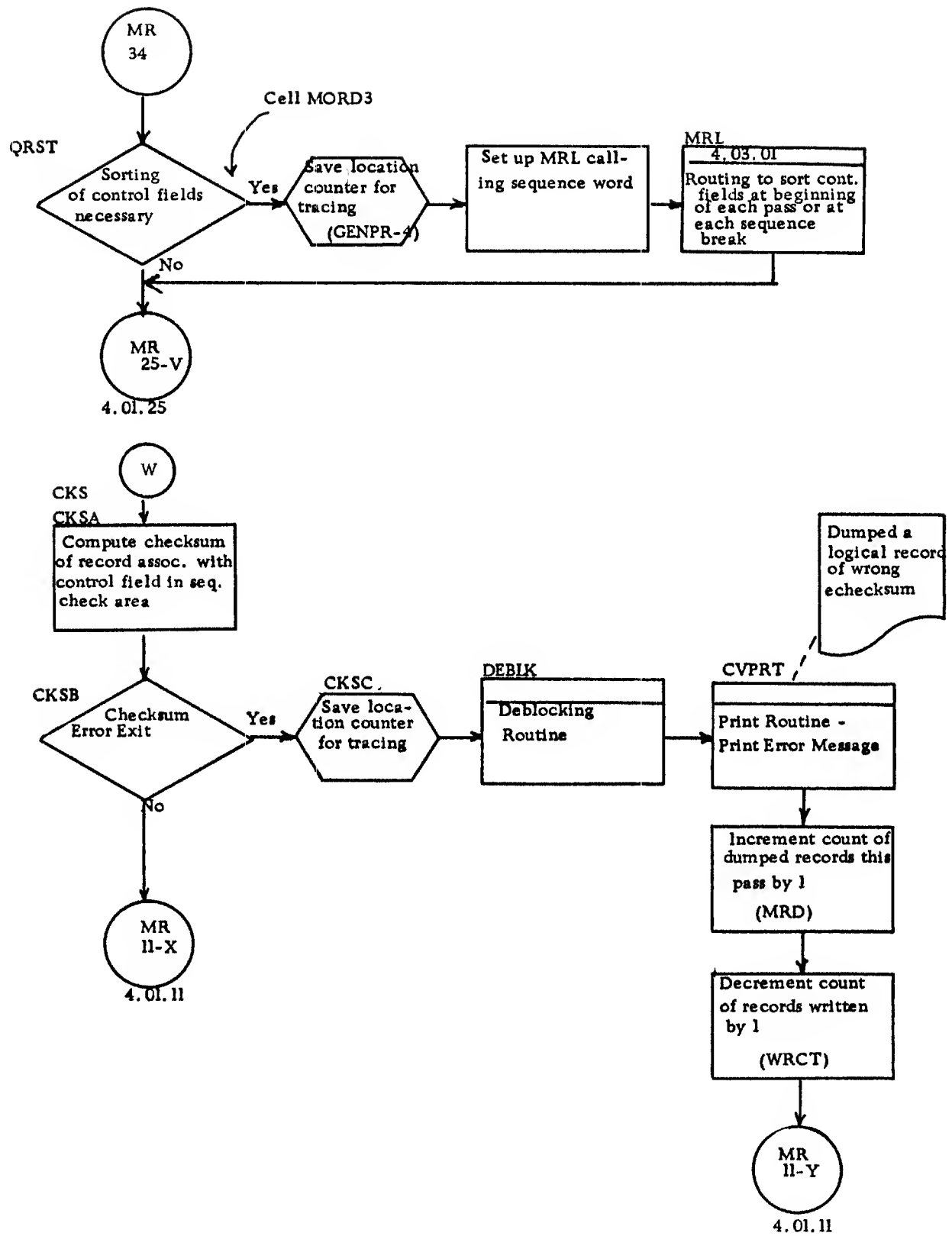




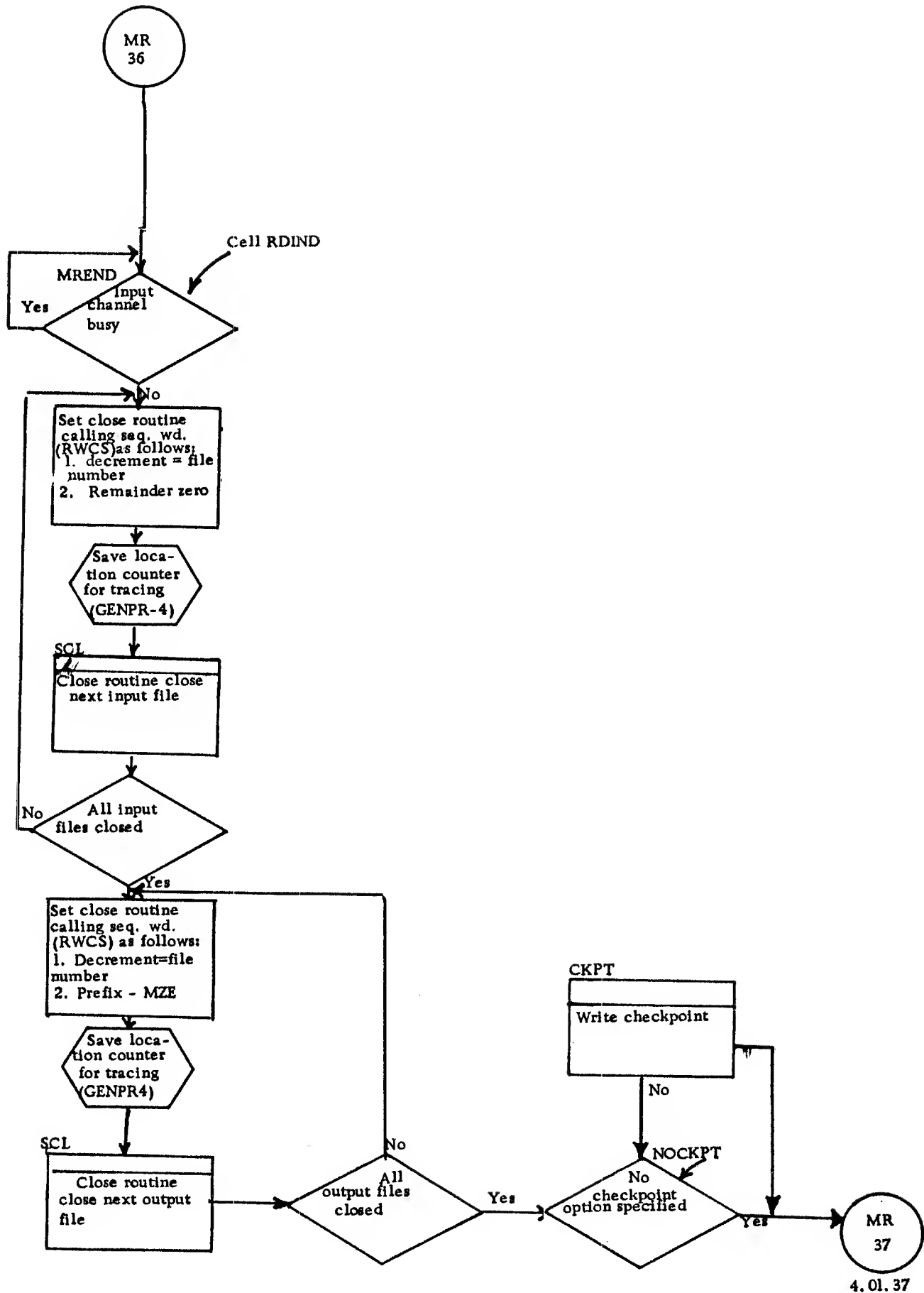


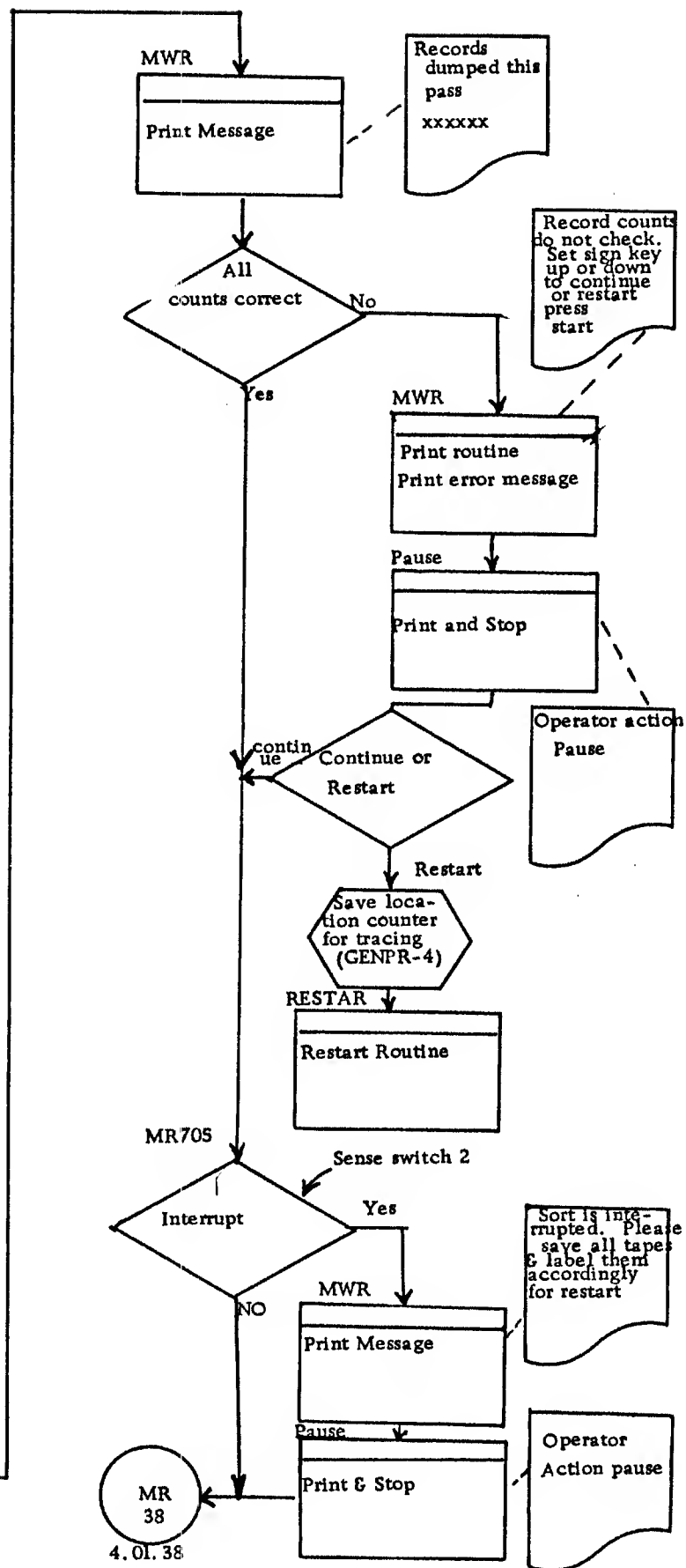
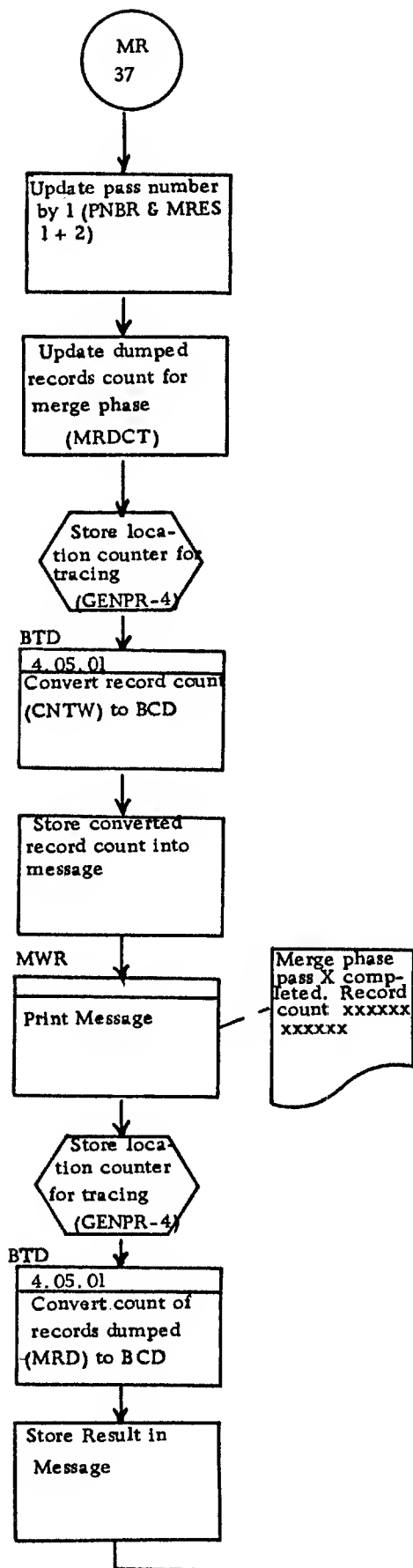


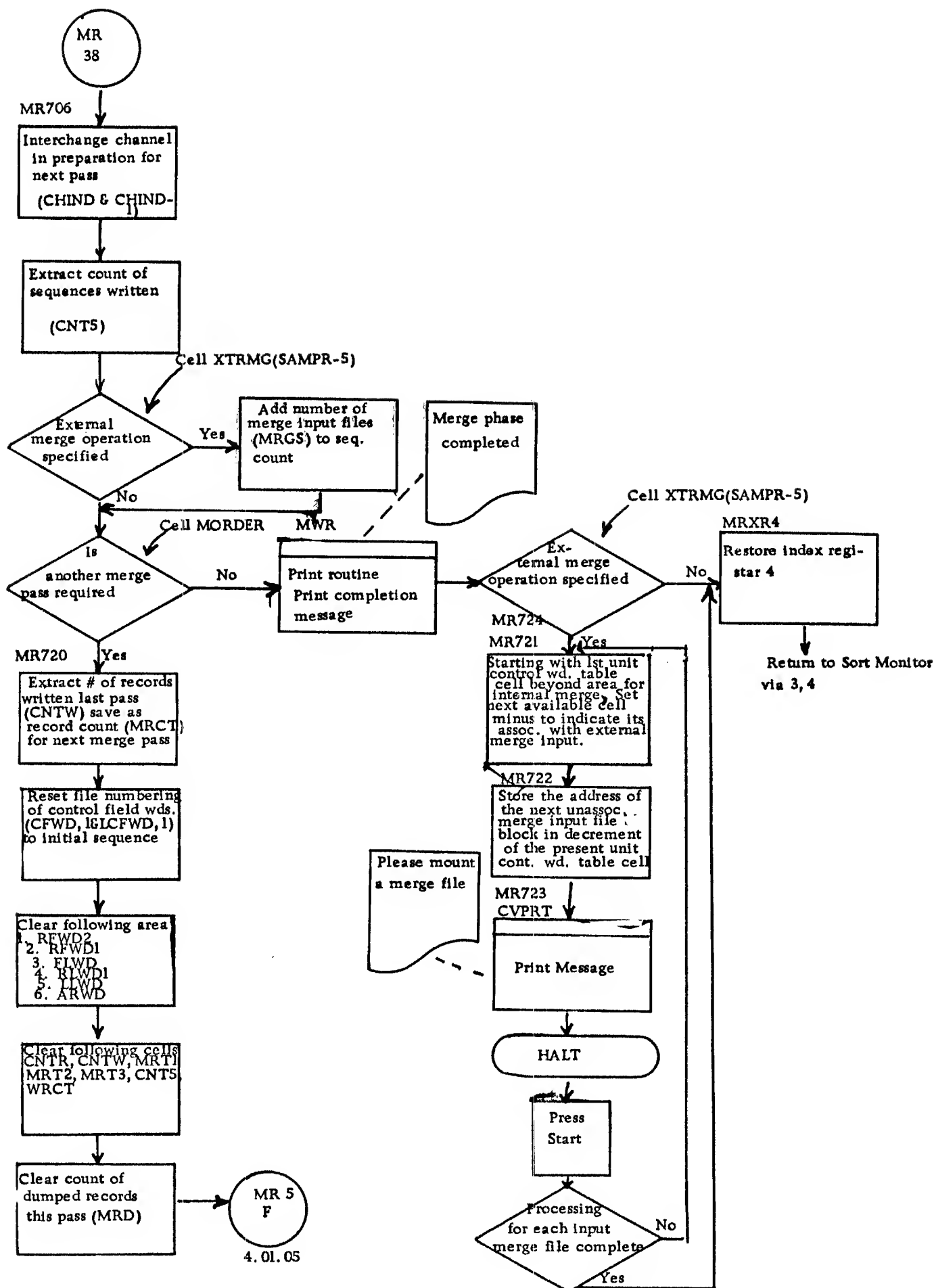










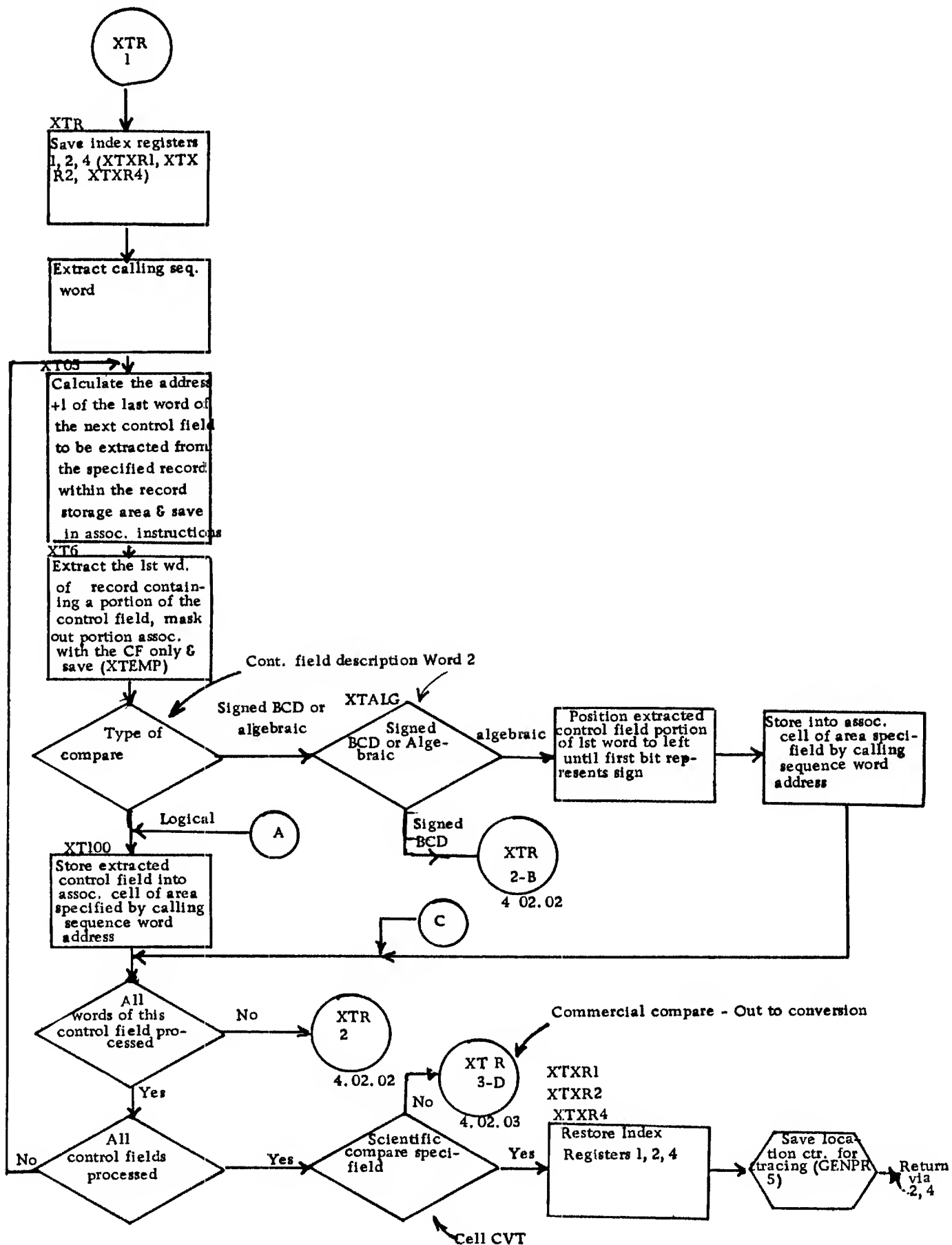


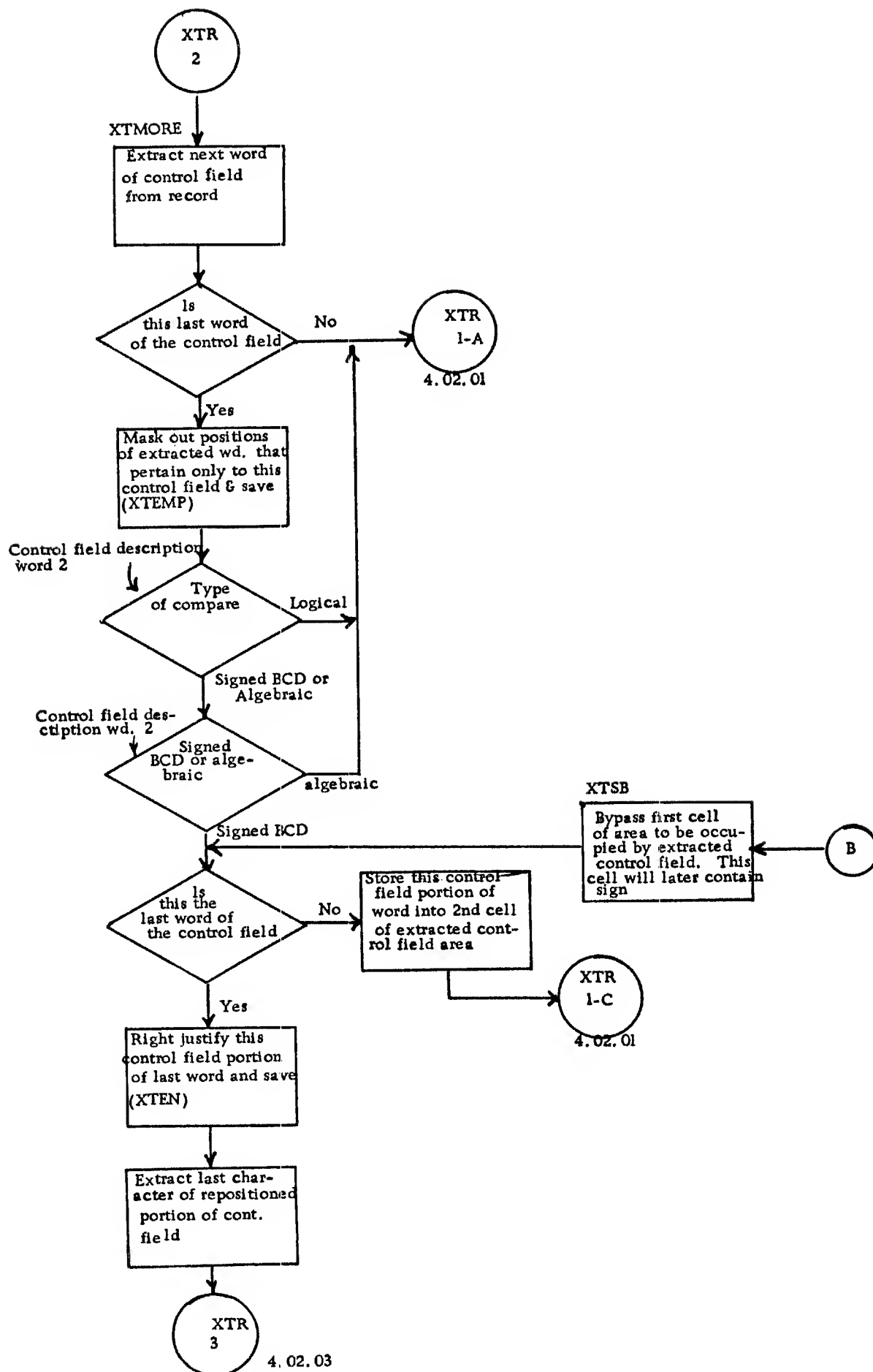
Extract routine  
to extract all cont.  
fields from record  
(Merge phase)

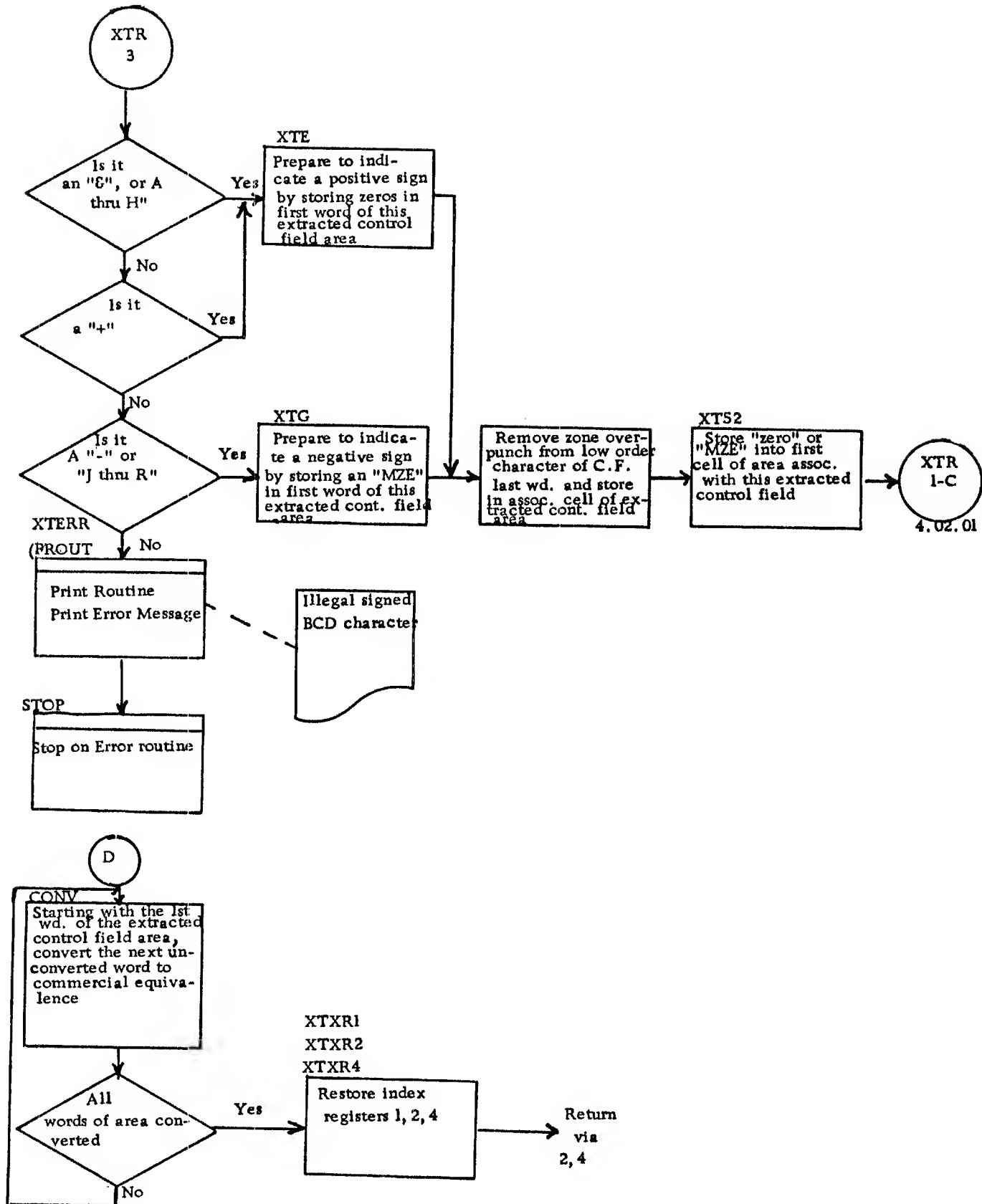
TSX XTR, 4

PZE     Adr, Dec

Adr = Origin of area extracted control field is to be stored in  
Dec = File number









Routine to sort  
control fields at  
beginning of each  
pass or at each  
sequence break

MRL  
1

MRL

Extract calling  
sequence word

Set "MRL routine"  
indication (cell  
(MRNCL/0)

NOTE: This cell will be tested by subroutine  
"LEQ" when called.

Specialize compare  
instruction addresses  
with base of "control  
field word table"  
specified (CFWD/  
LCFWD)

Specialize remain-  
ing compare instru-  
ction addresses with  
base of "cont. field  
wd. table" specified  
+ 1 (CFWD+1/LCFWD+1)

Save index  
register 4  
(MRL>R4)

Save merge order  
specified  
(MRLXR4-1)

SAVE LOCATION COUNTER FOR TRACING (GENPR-4)

Prepare to compare  
1st word of 1st cont.  
field specified of  
1st two sequential  
files

Save index register  
4  
(MRNR4)

A

Type  
of compare  
desired

NOTE: 0 = Logical ascending 2 = Algebraic ascending  
1 = Logical descending 3 = Algebraic descending

MRL 48

MRLCPA  
MRLCPB

Perform logical ascen-  
ding compare  
(A C-Higher order  
cell; Y lower order)

MRLCPA-1  
MRLCPB-1

Perform logical descen-  
ding compare  
(AC-Lower order  
cell; Y-Higher  
order)

MRLCPA-2  
MRLCPB-2

Perform algebraic  
ascending compare  
(AC-higher order  
cell; Y-Lower order)

MRLCPA-3  
MRLCPB-3

Perform algebraic  
descending compare  
(AC-Lower order cell  
Y-Higher Order)

MRL  
2

NOTE: AC=Accumulator; Y = Storage

TSX MRL-4

PZE CFWD/LCFWD, Merge Order

CFWD= Base of "control field word table" for 1st  
record of a block.

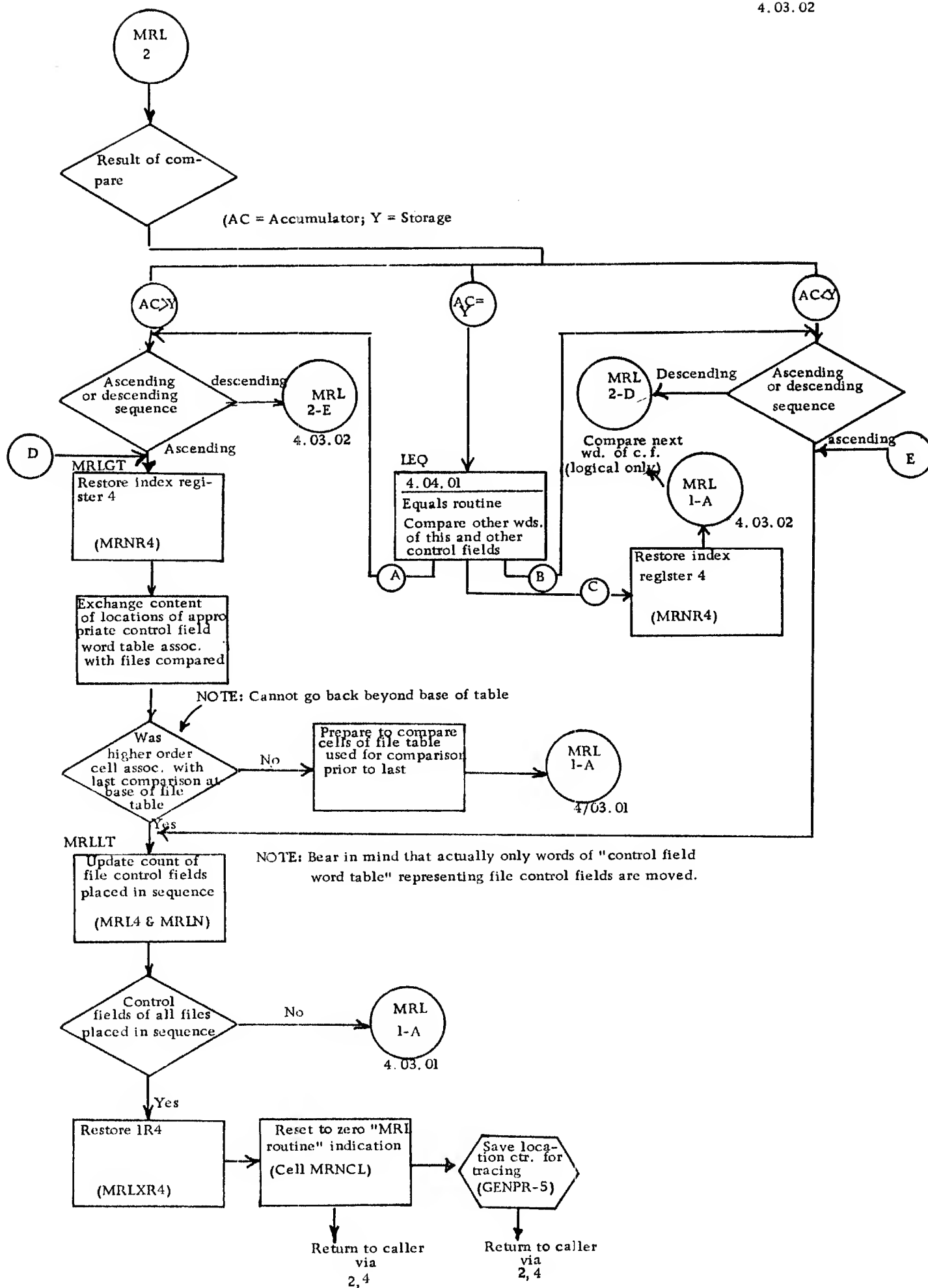
LCFWD= Base of "control field word table" for last  
record of a block

NOTE: "Control field word table" specifies the  
followings:

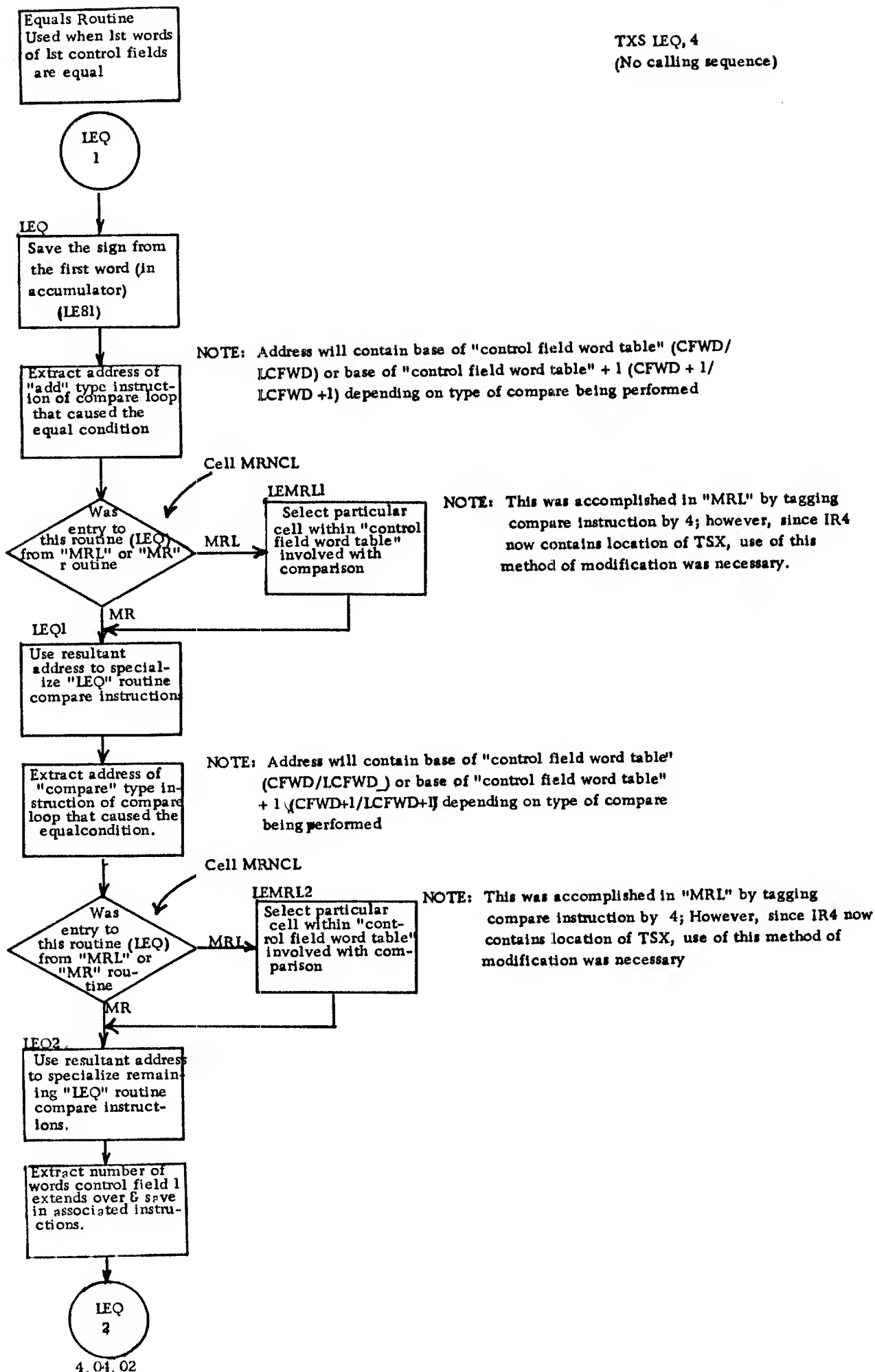
Adr = Origin of extracted control field area

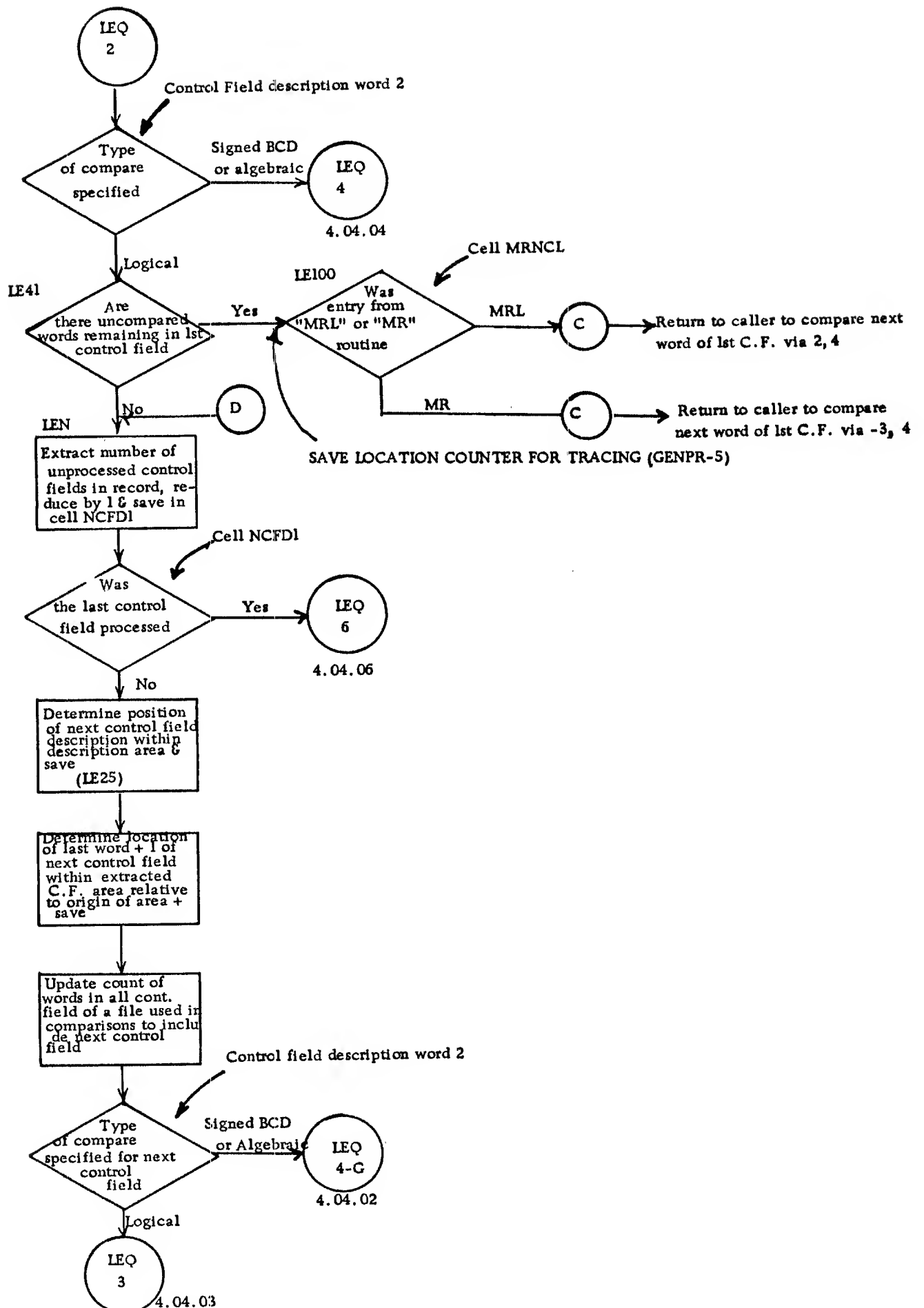
Tag = 1

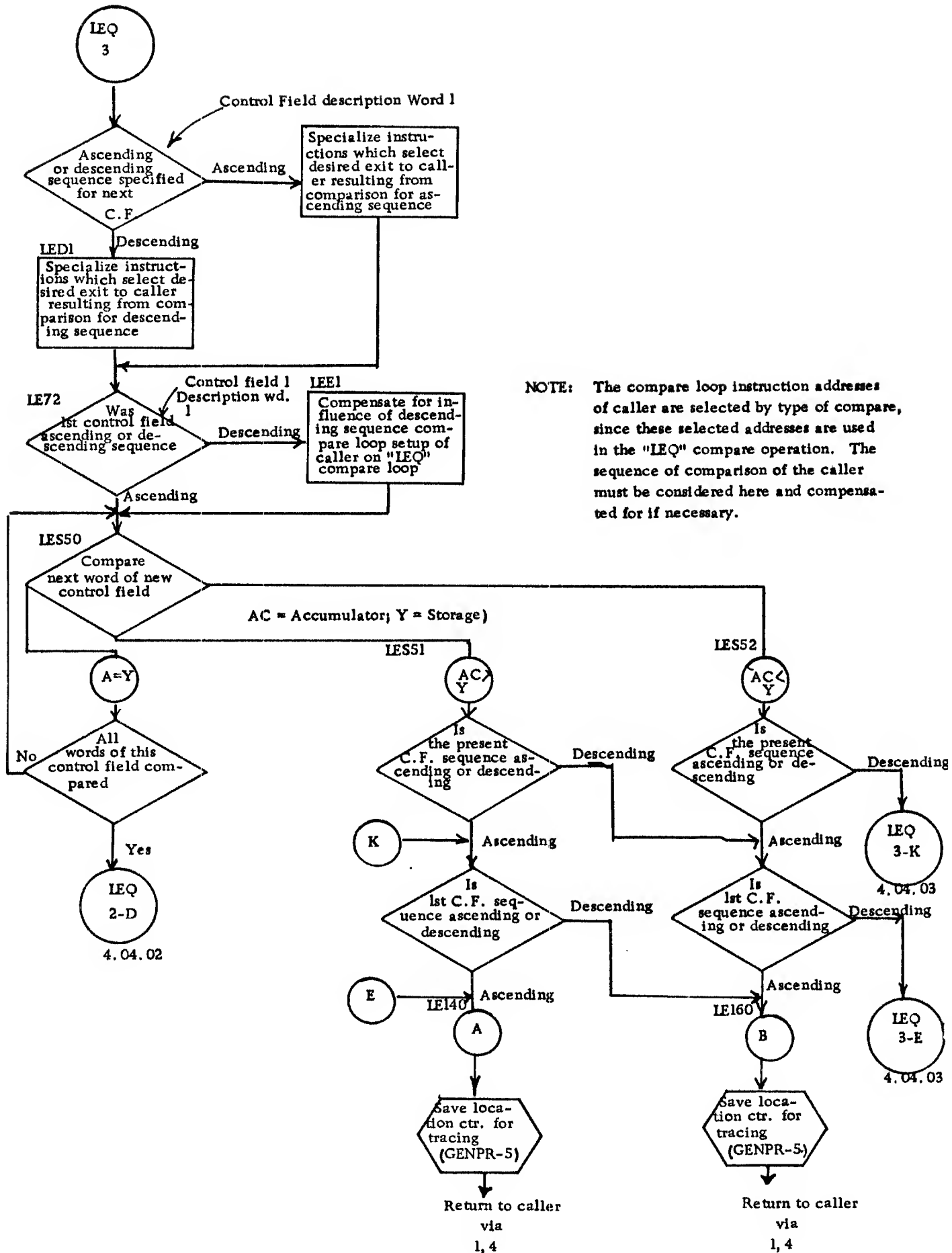
Dec = File number

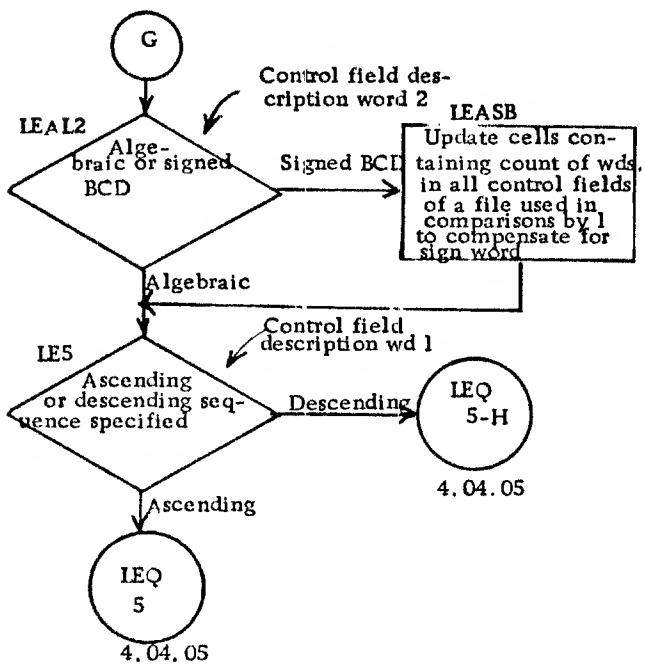
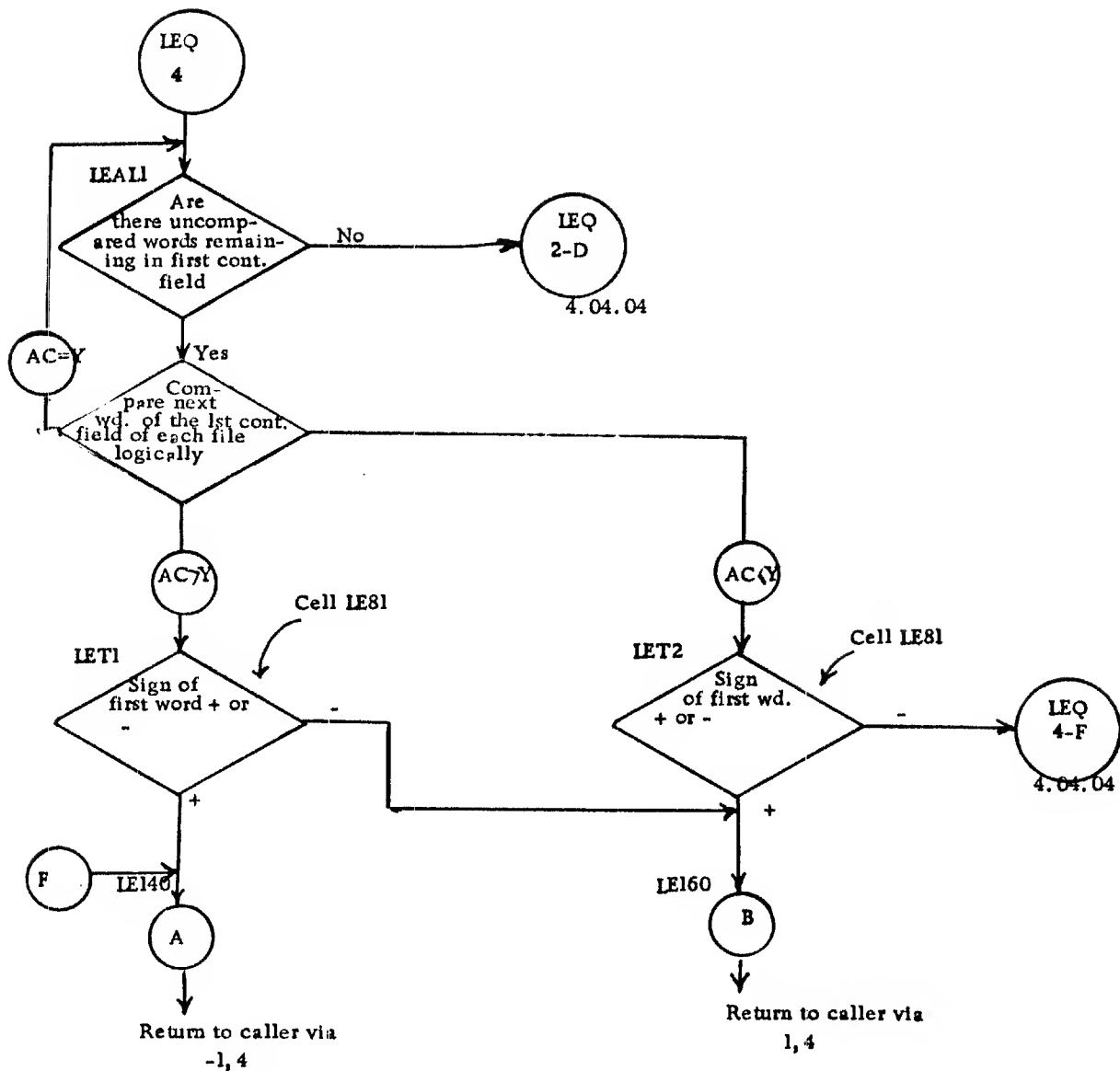


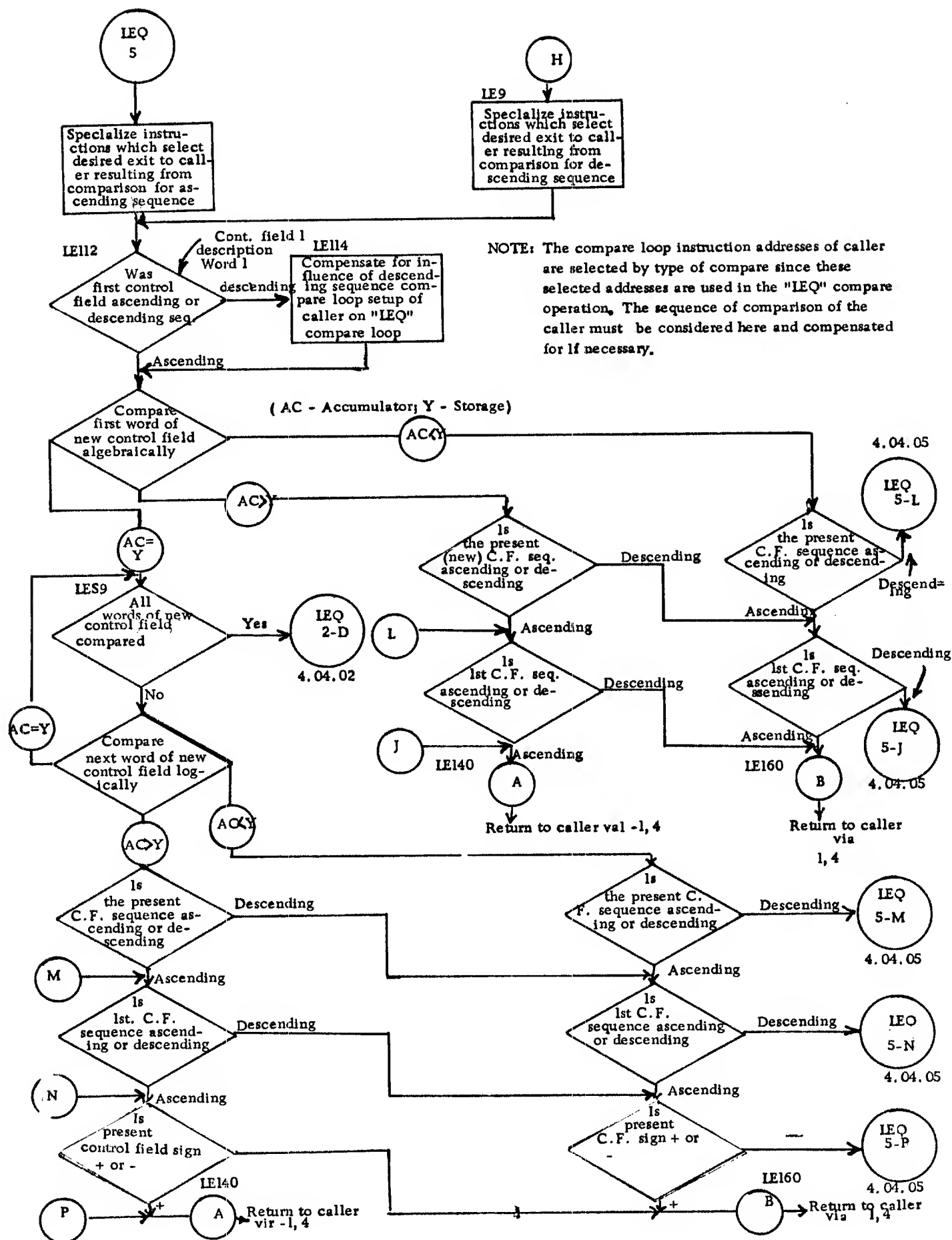
TXS LEQ, 4  
(No calling sequence)

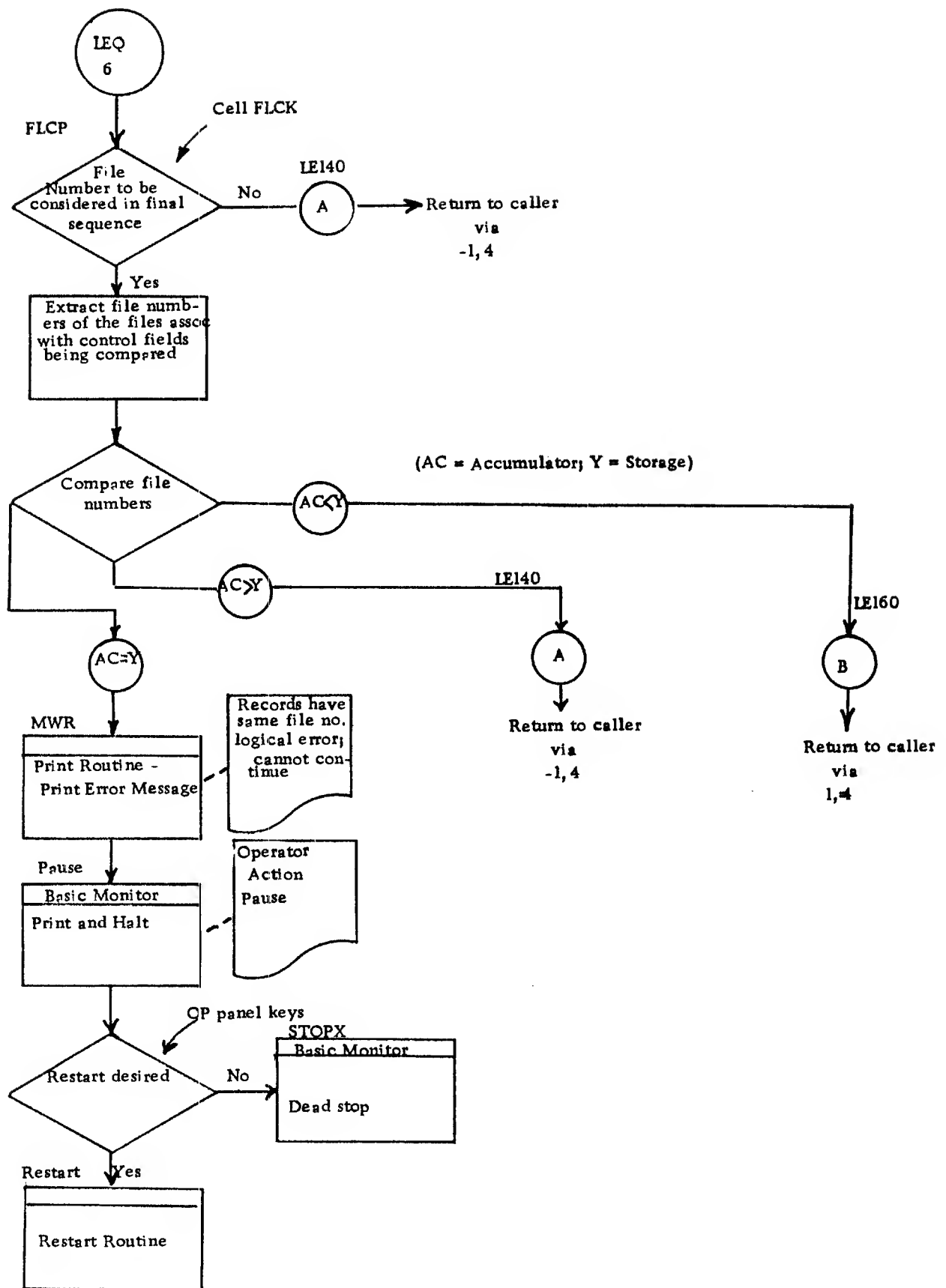










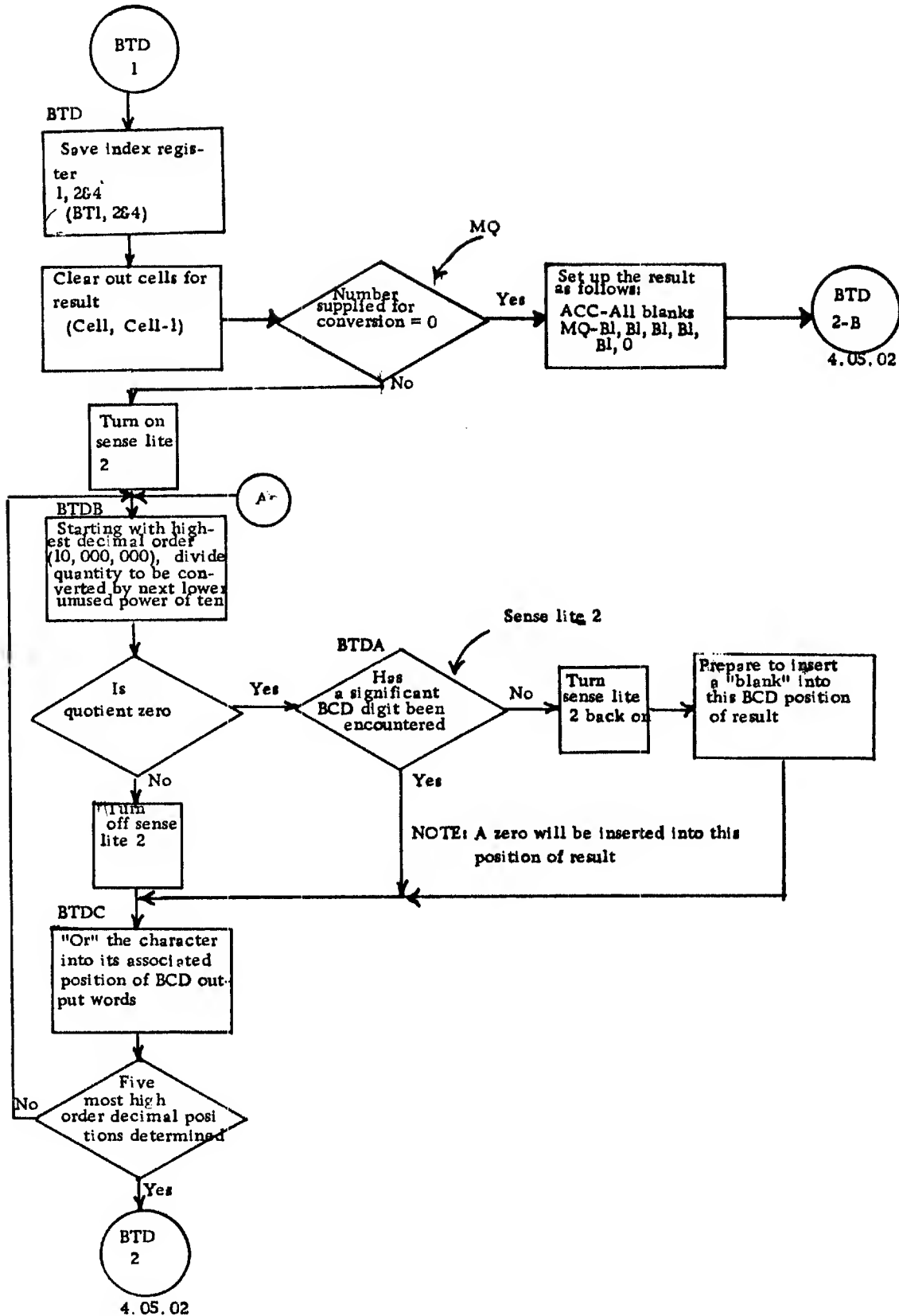


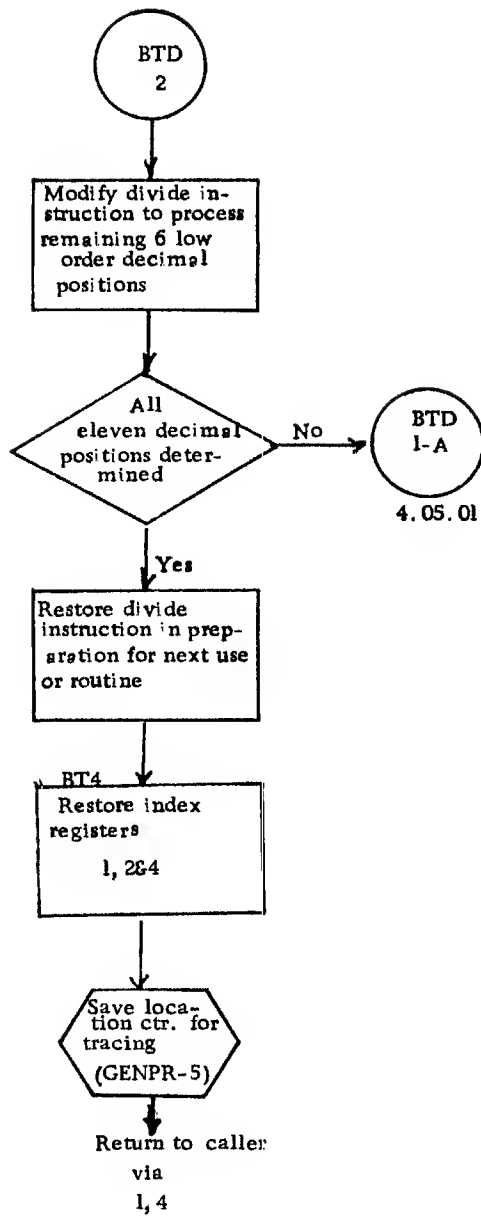


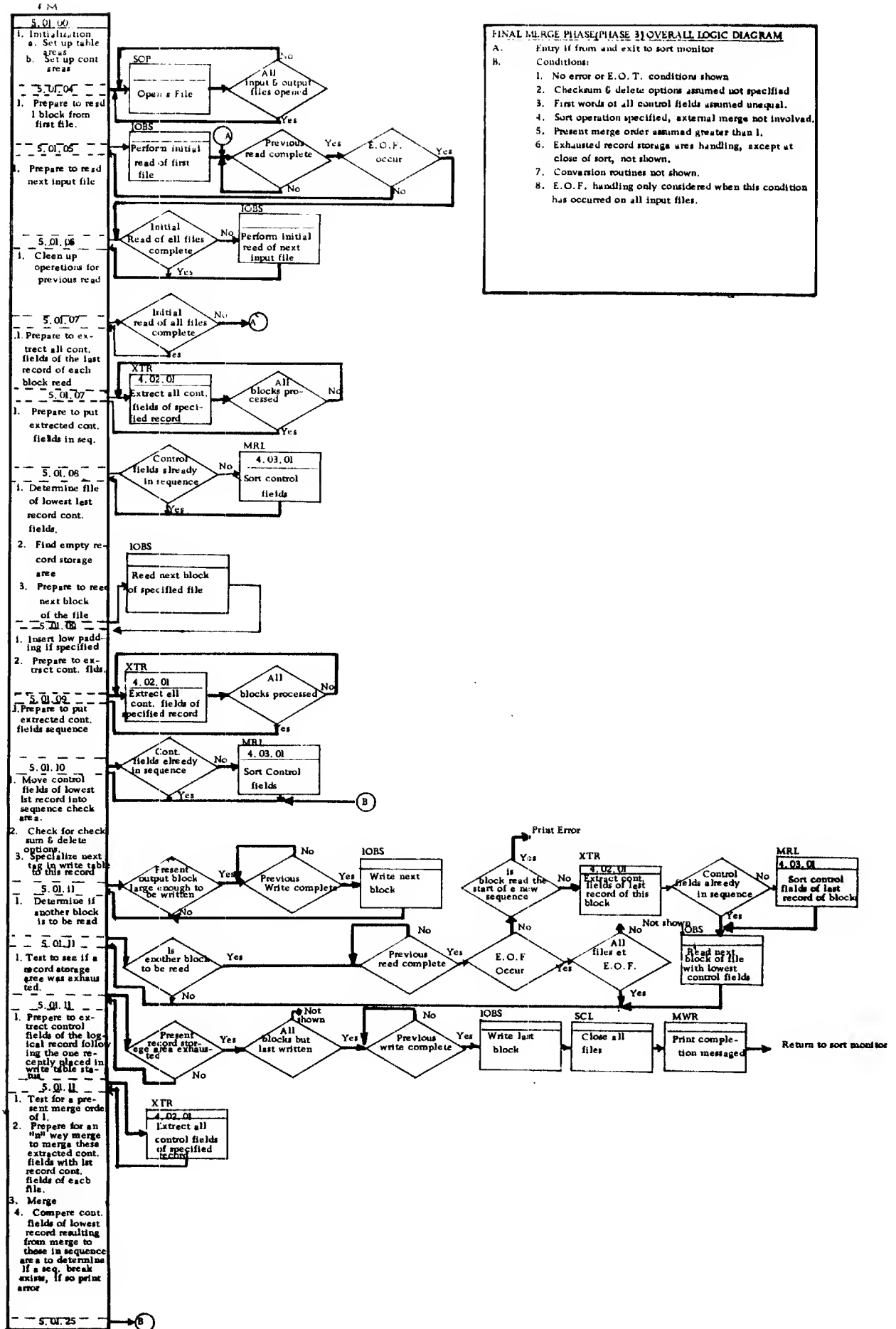
Binary to BCD  
numerical  
conversion

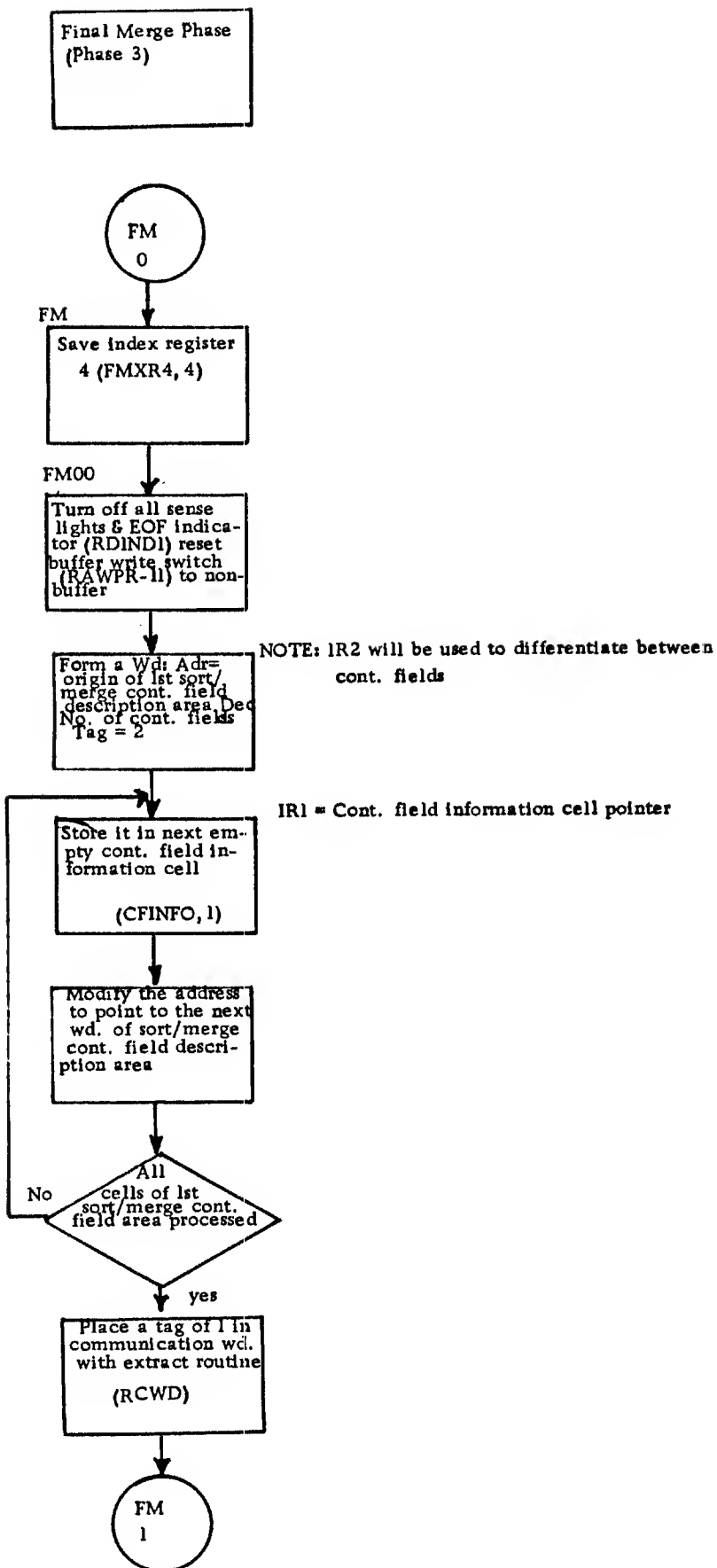
TSX BTB, 4

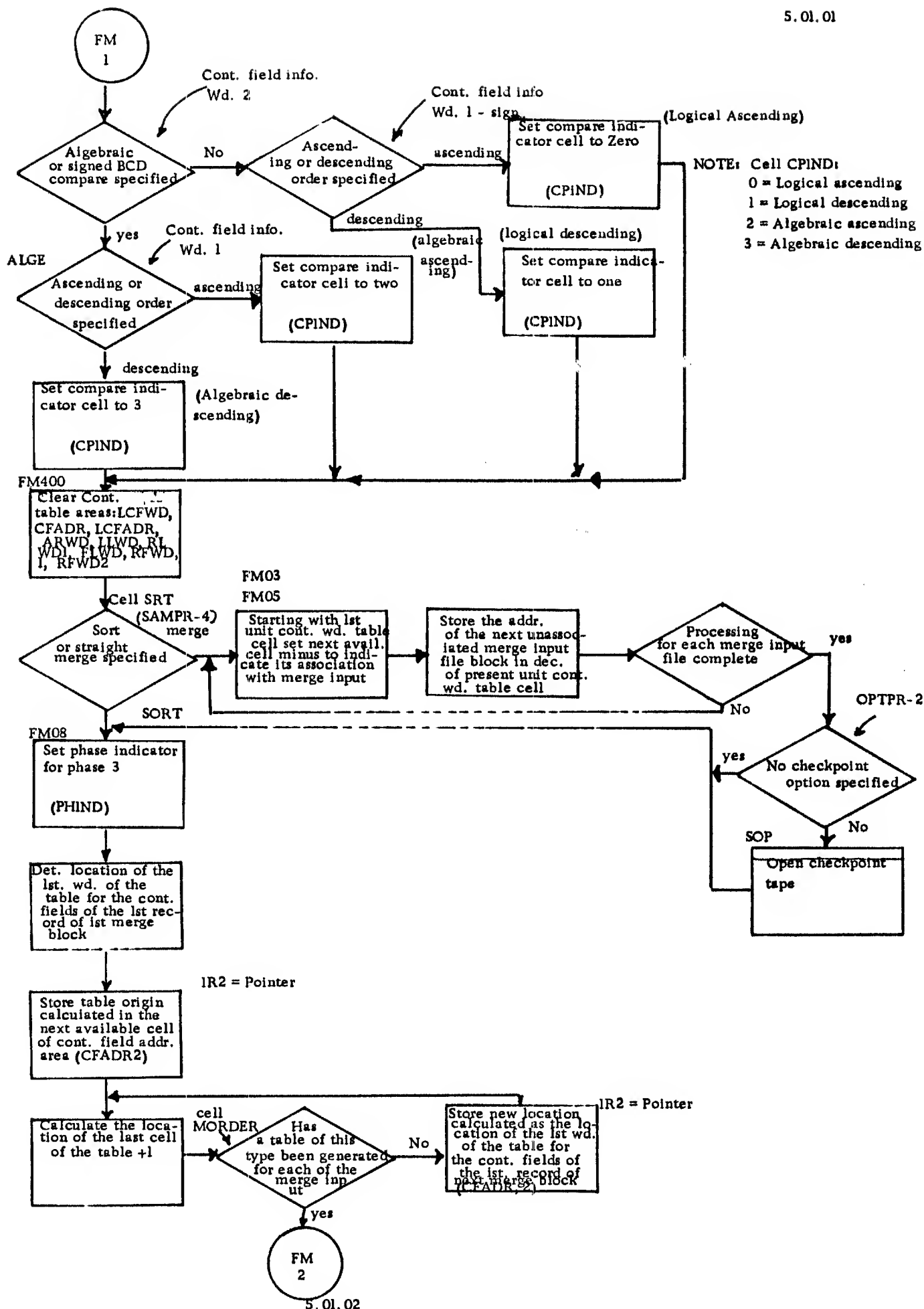
(number to be converted must be in  
MQ)

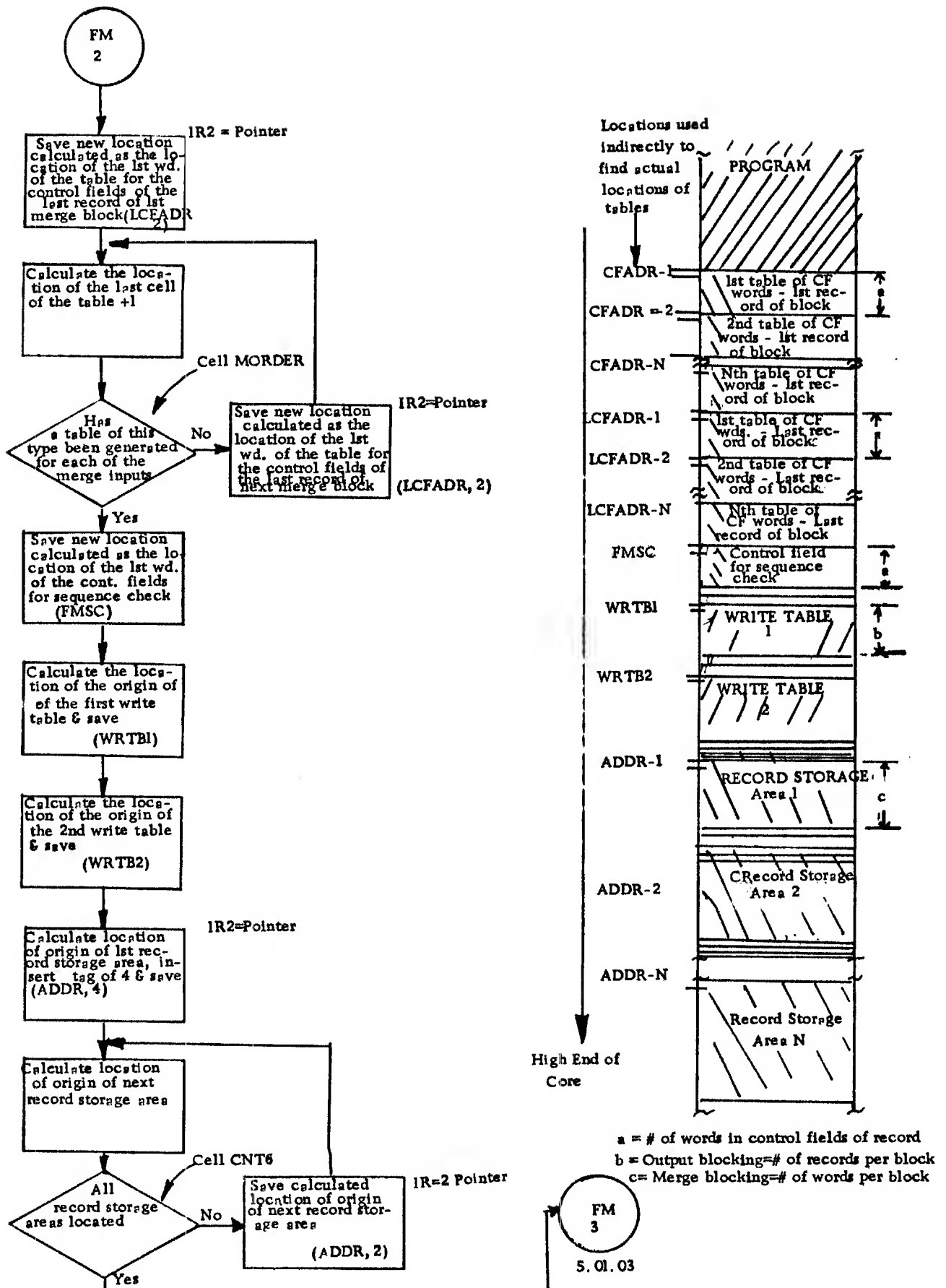


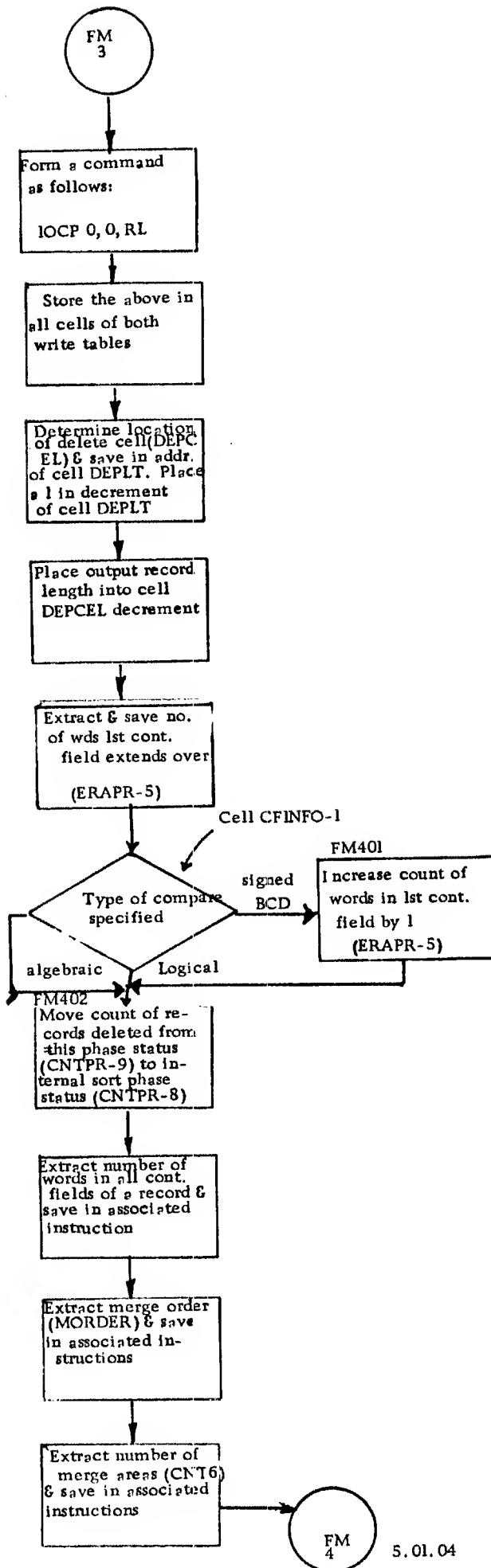


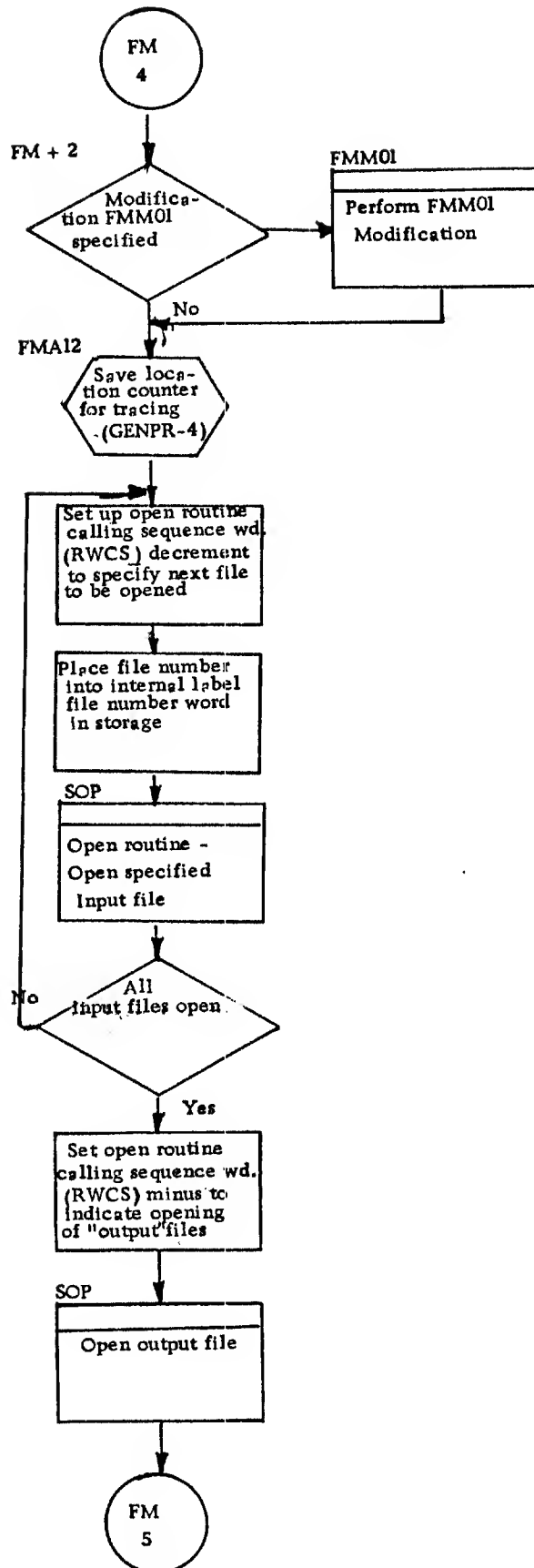




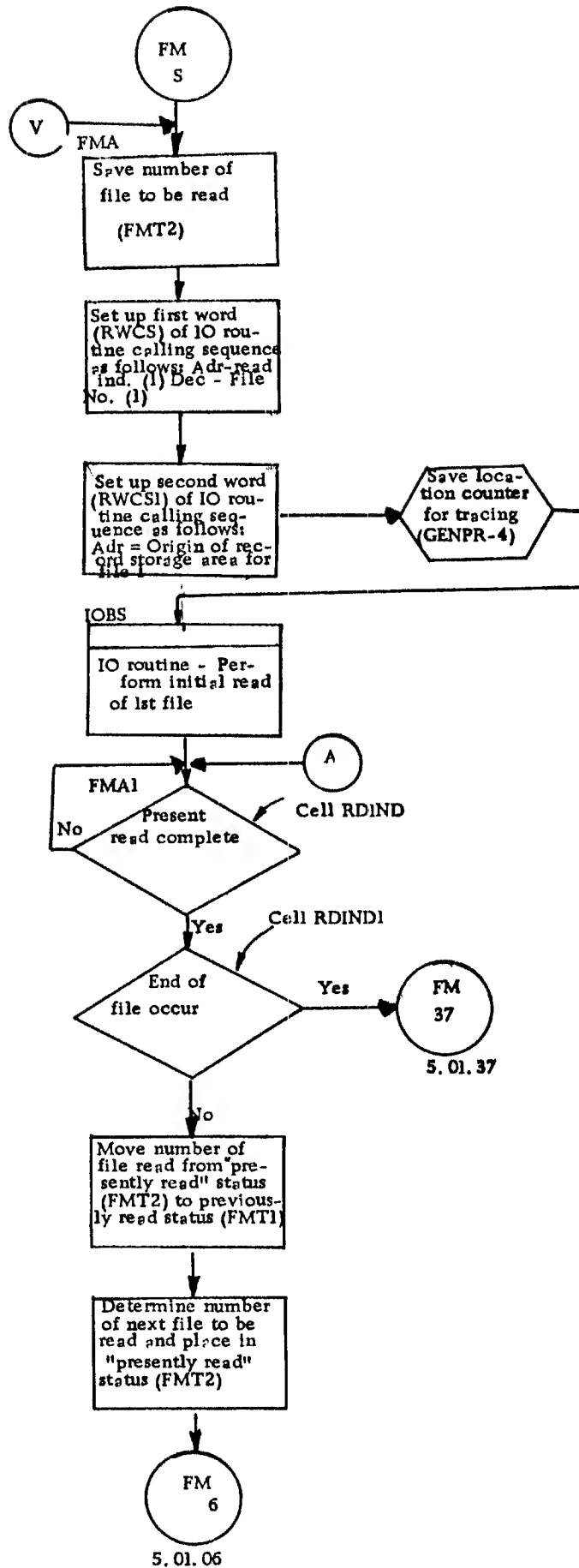


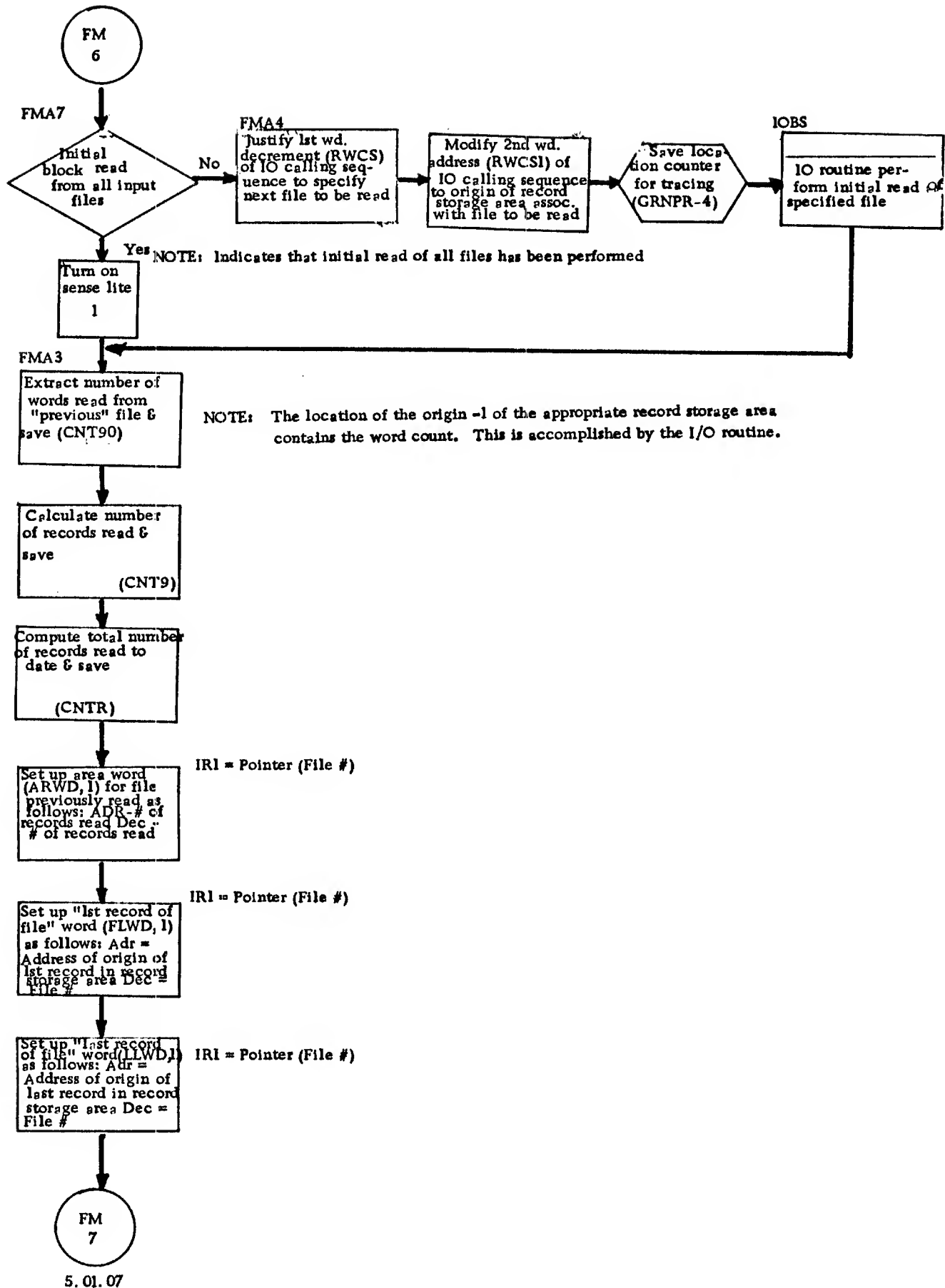


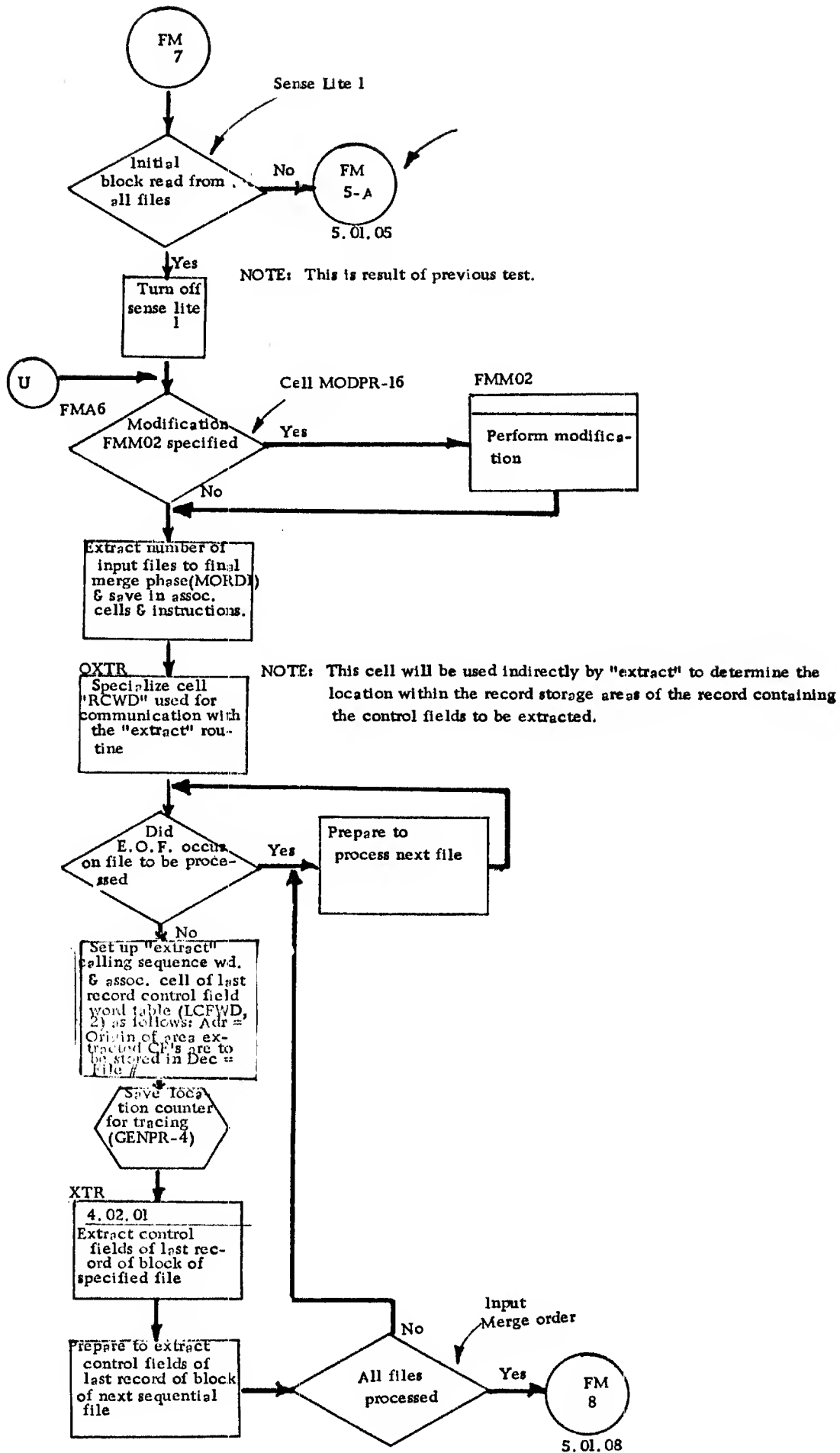


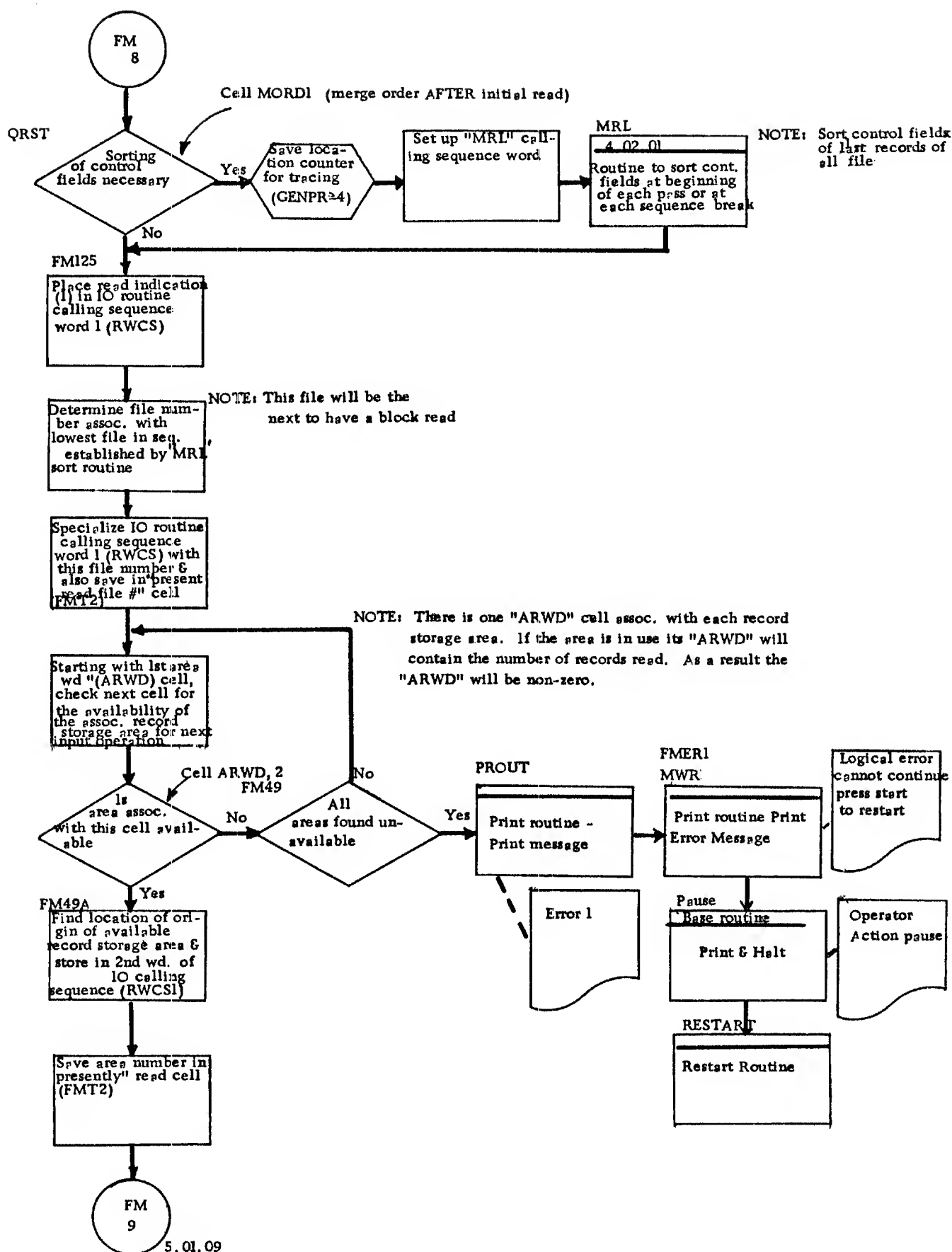


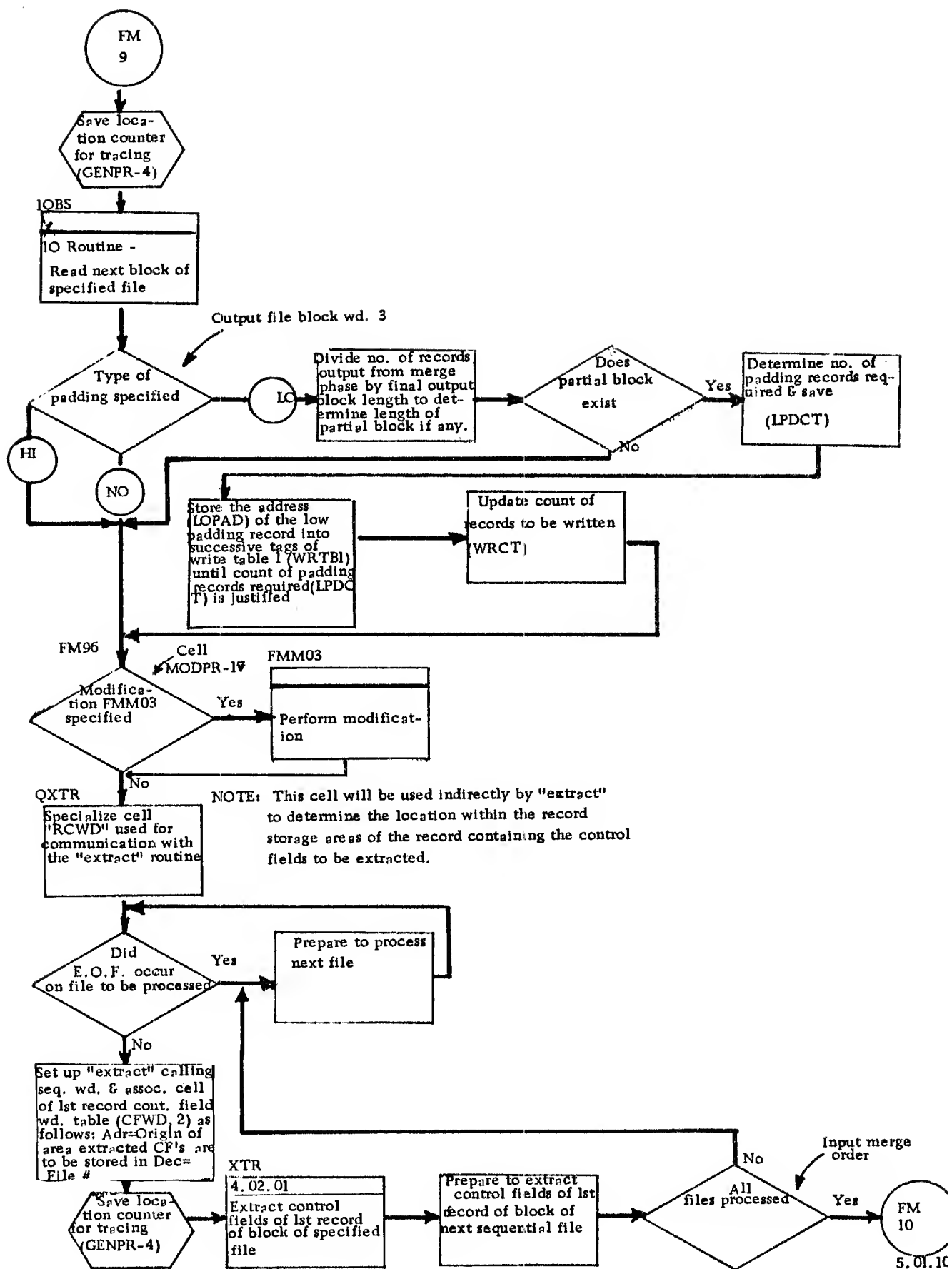


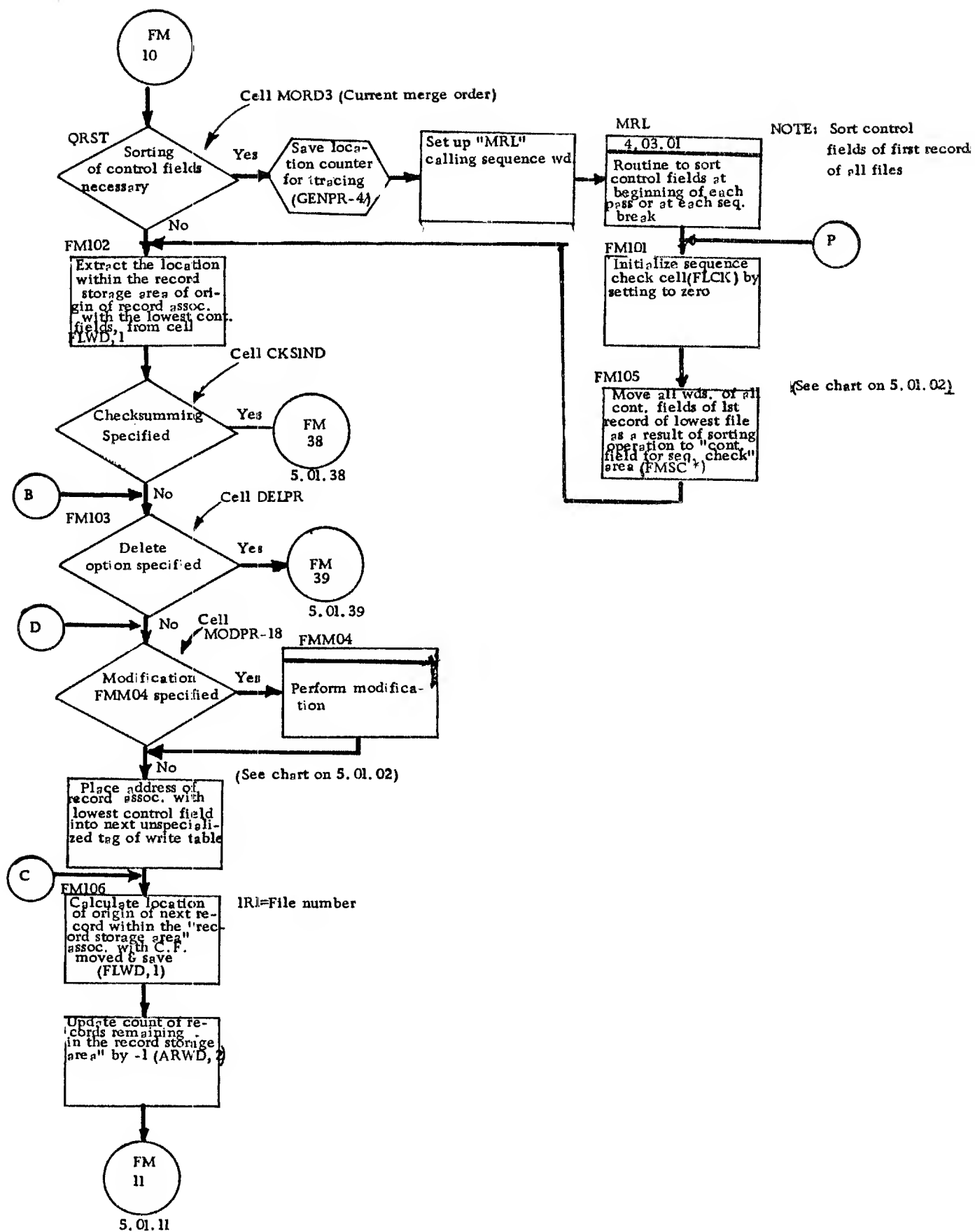


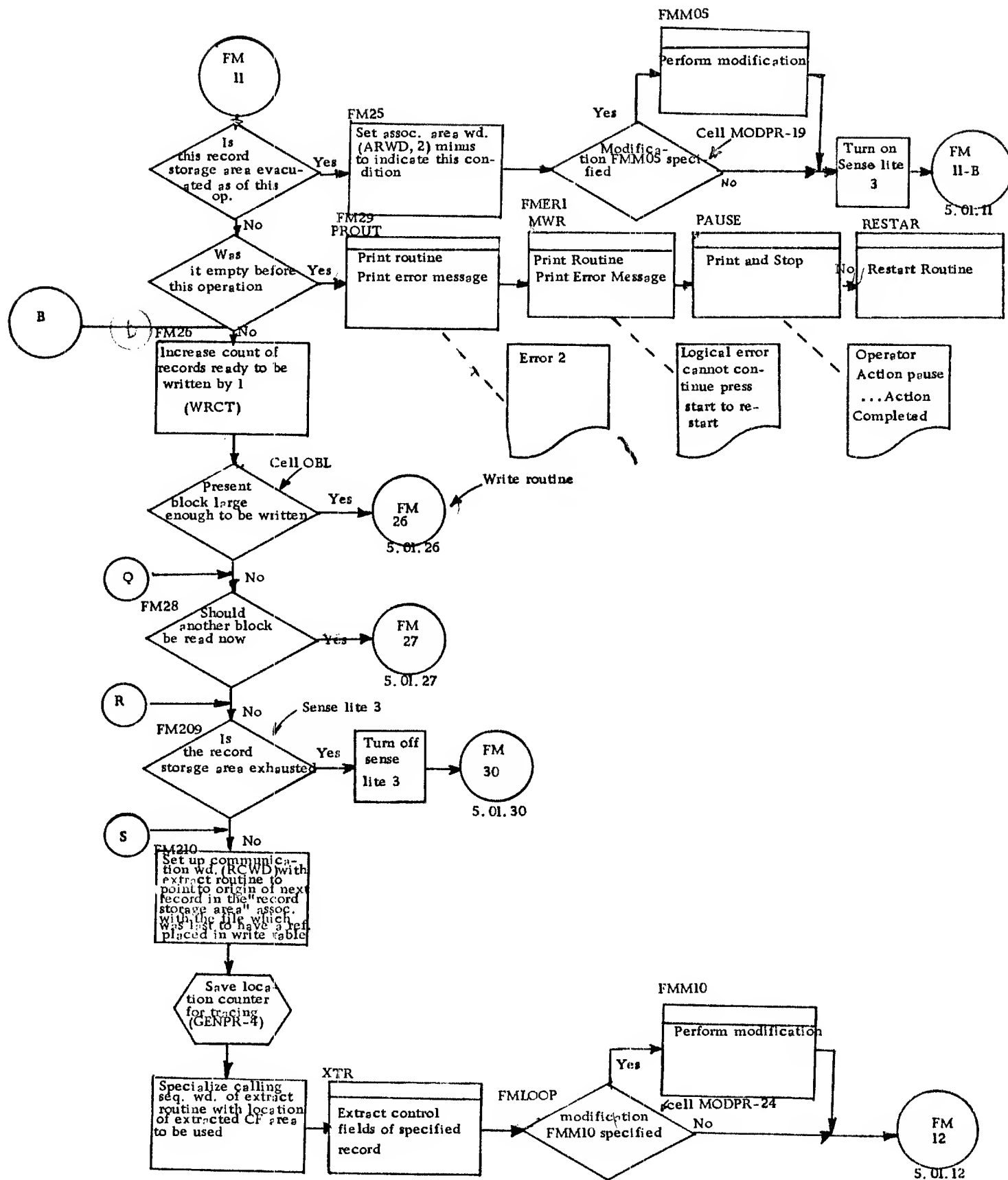


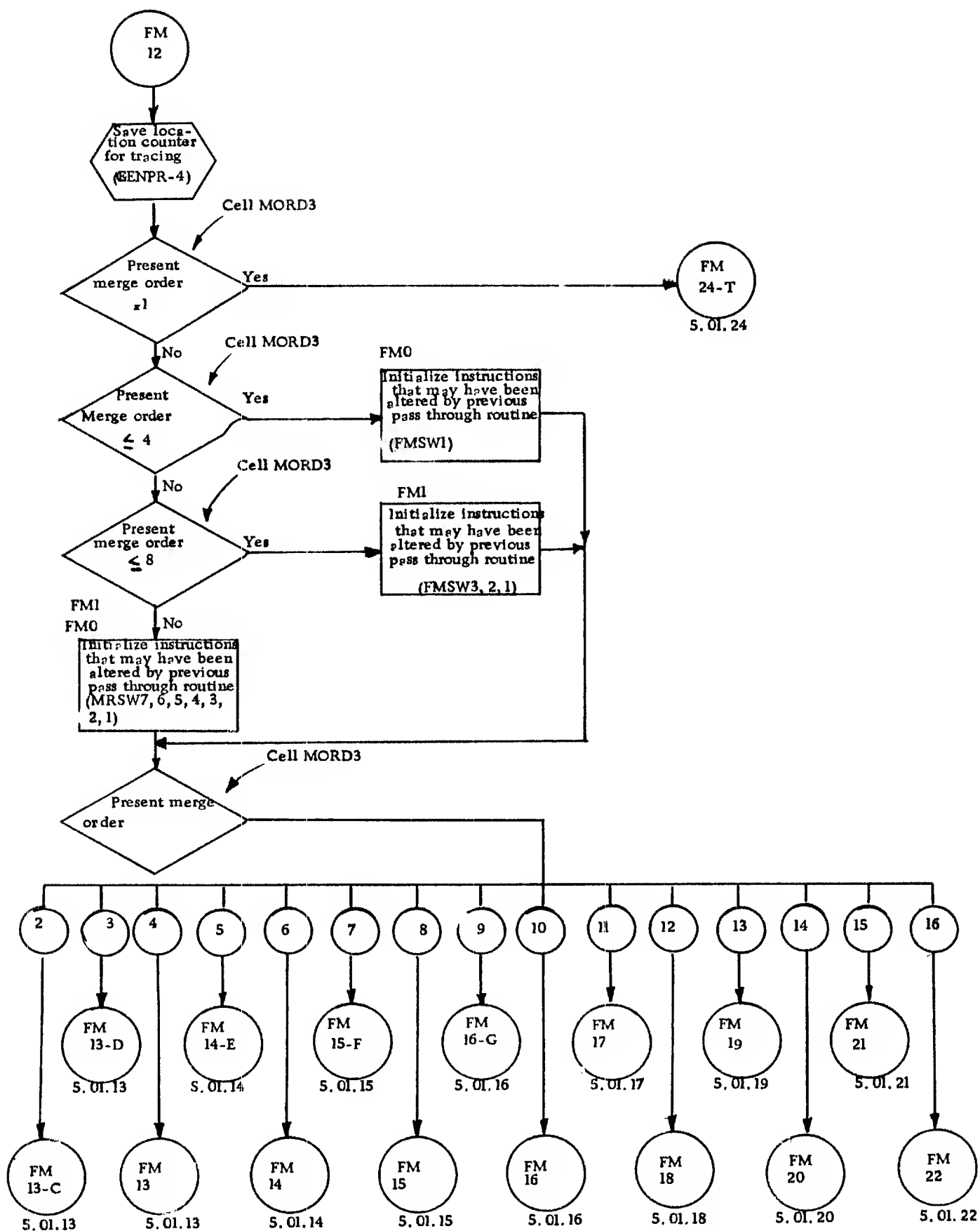




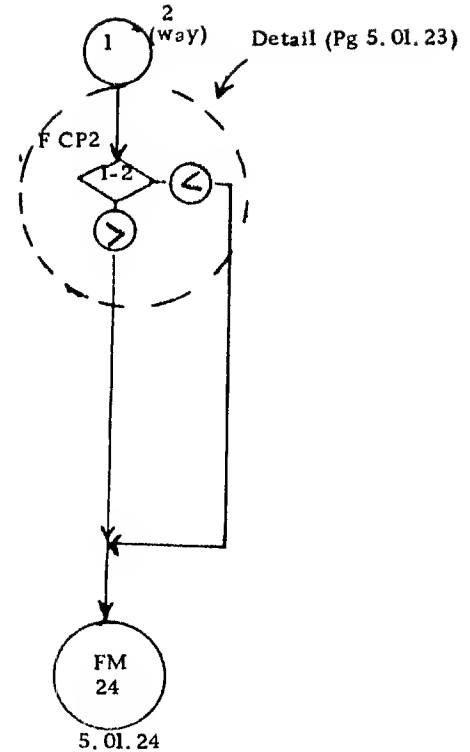
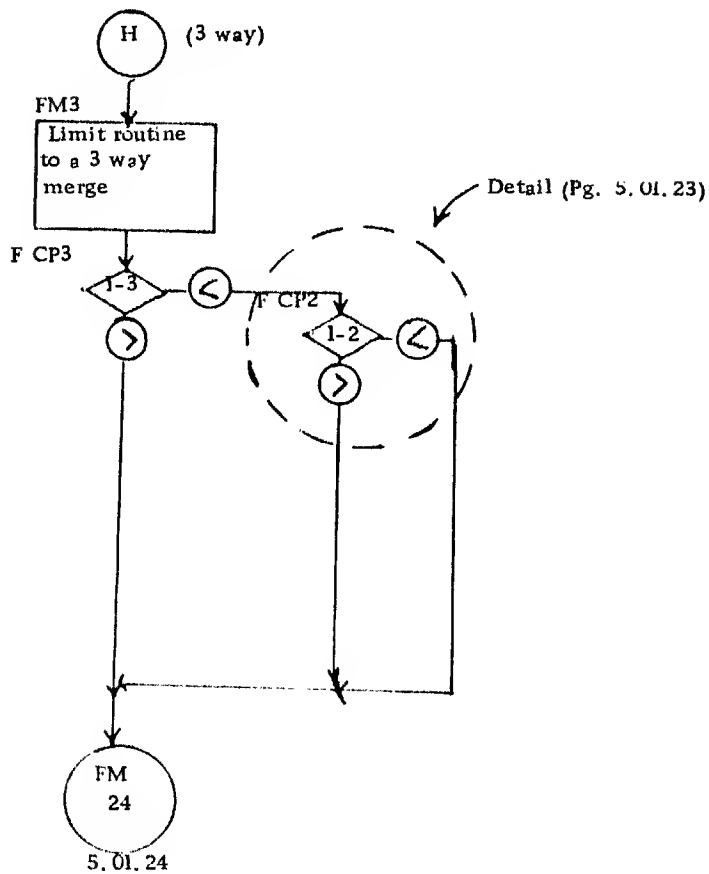
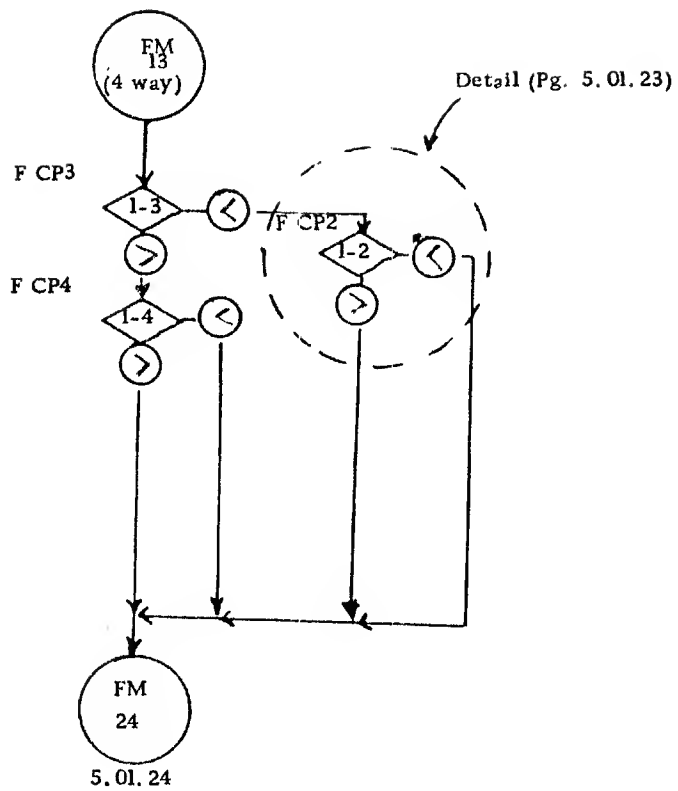






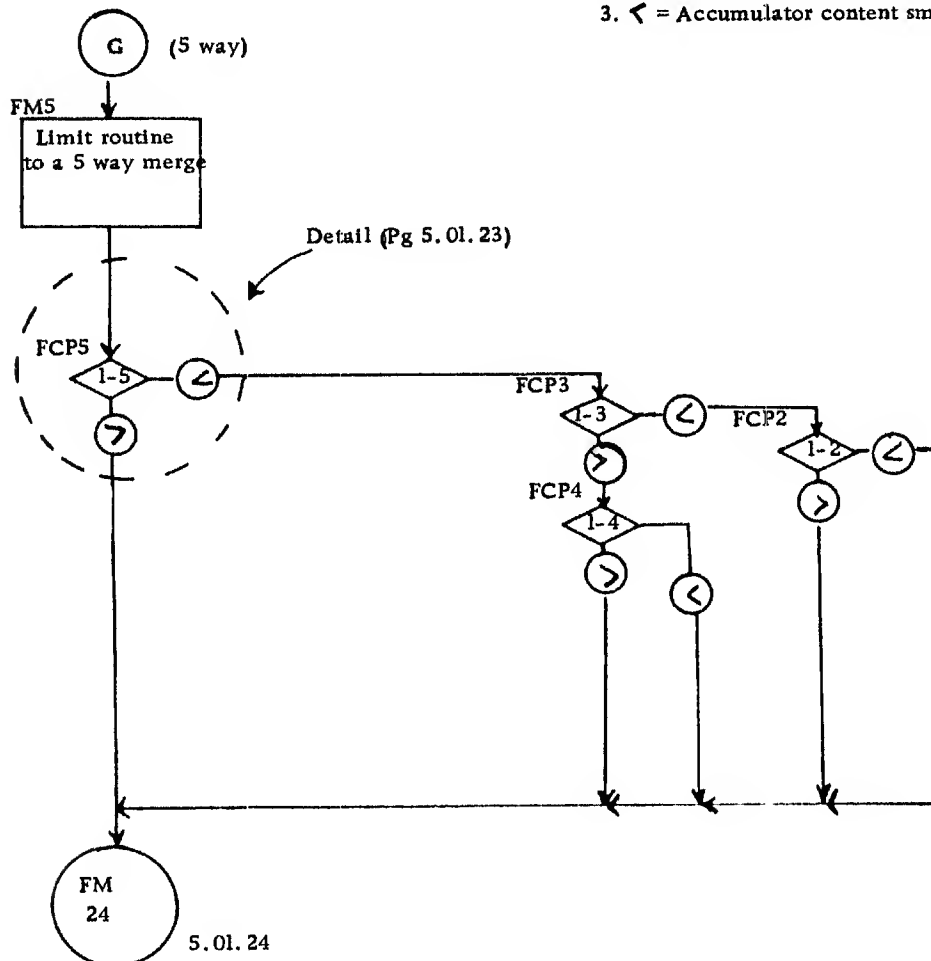
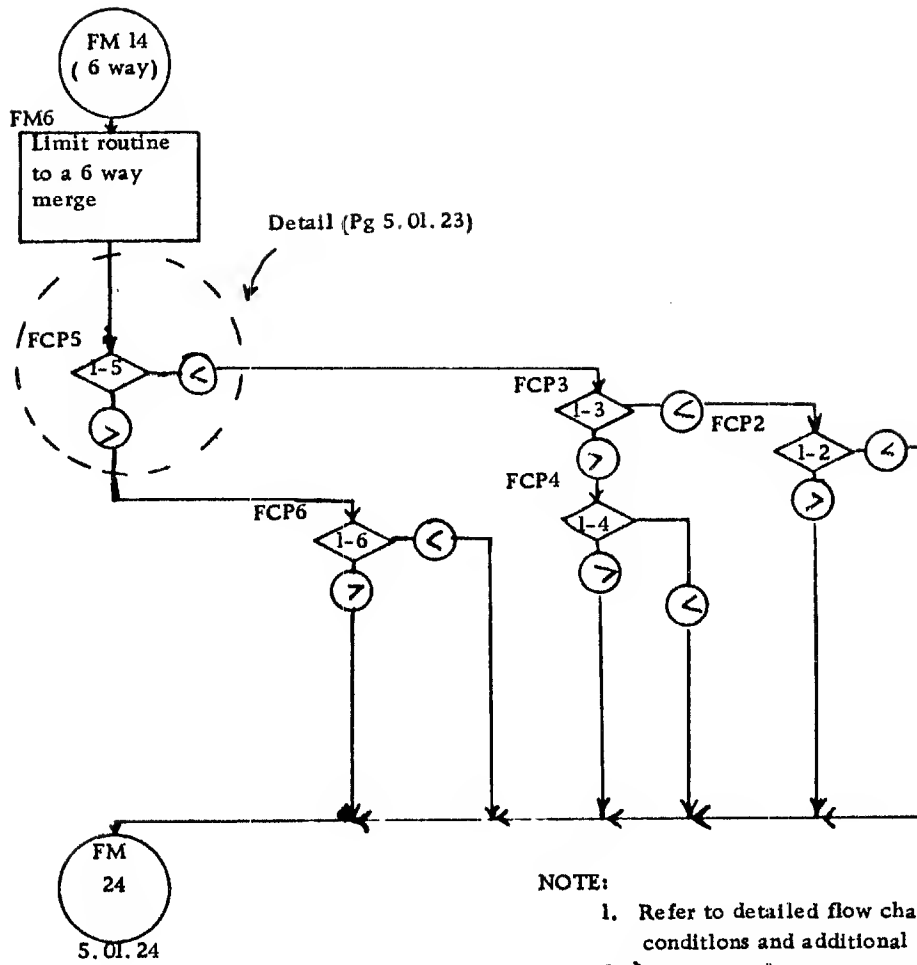


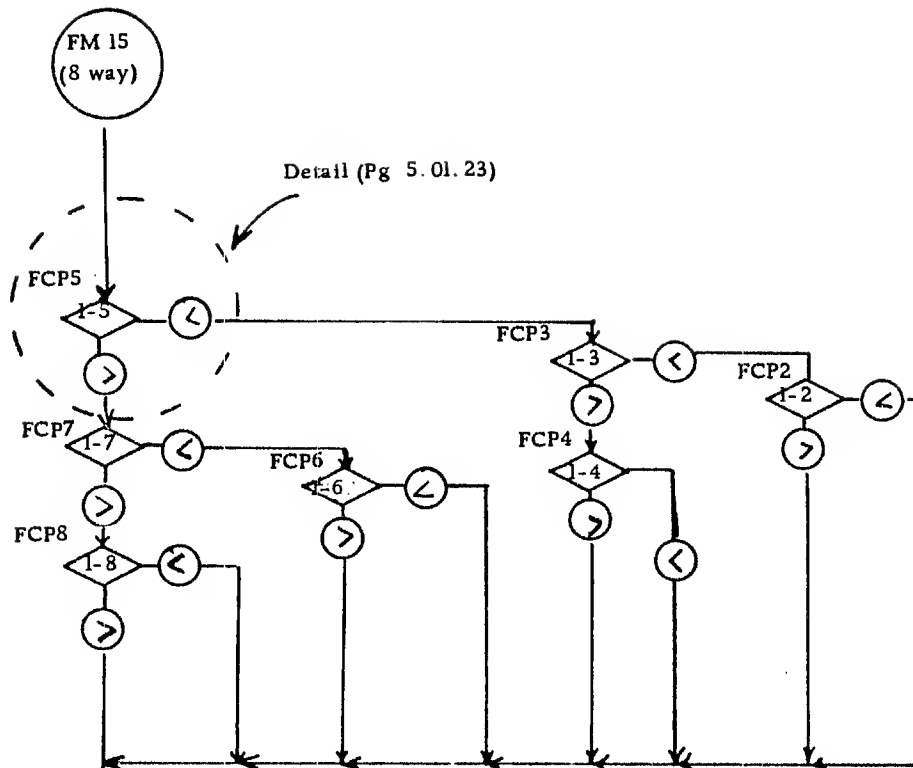




## NOTE:

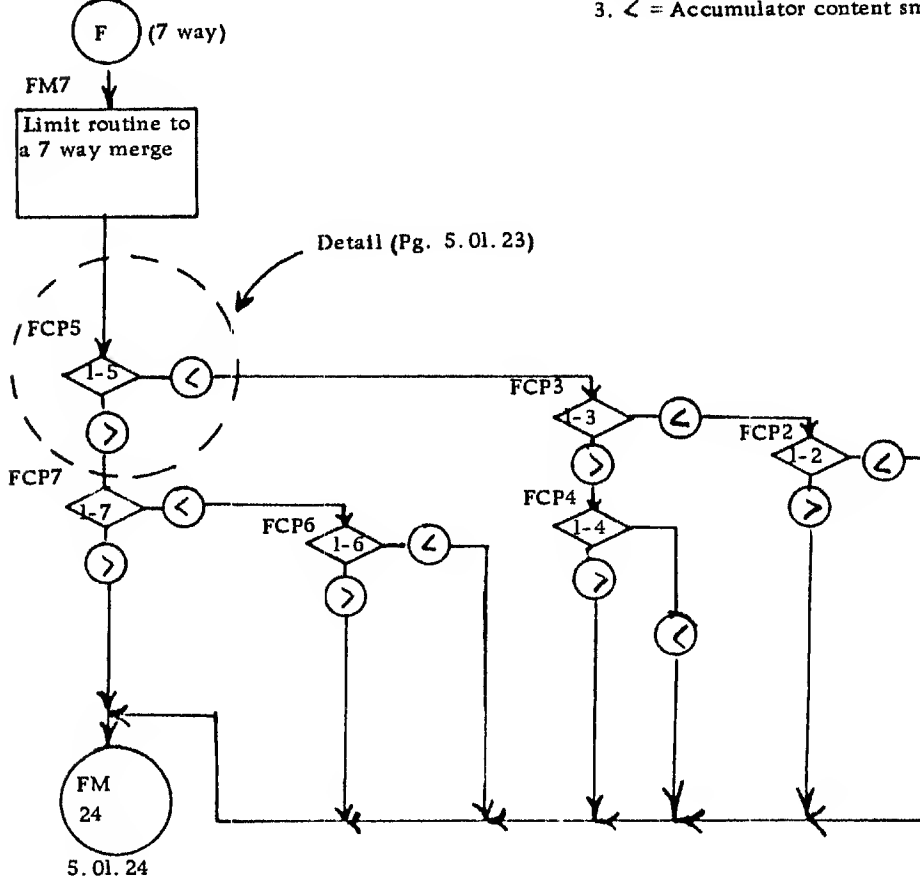
1. Refer to detailed flow chart (5.01.23) for "equal" conditions and additional facts.
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

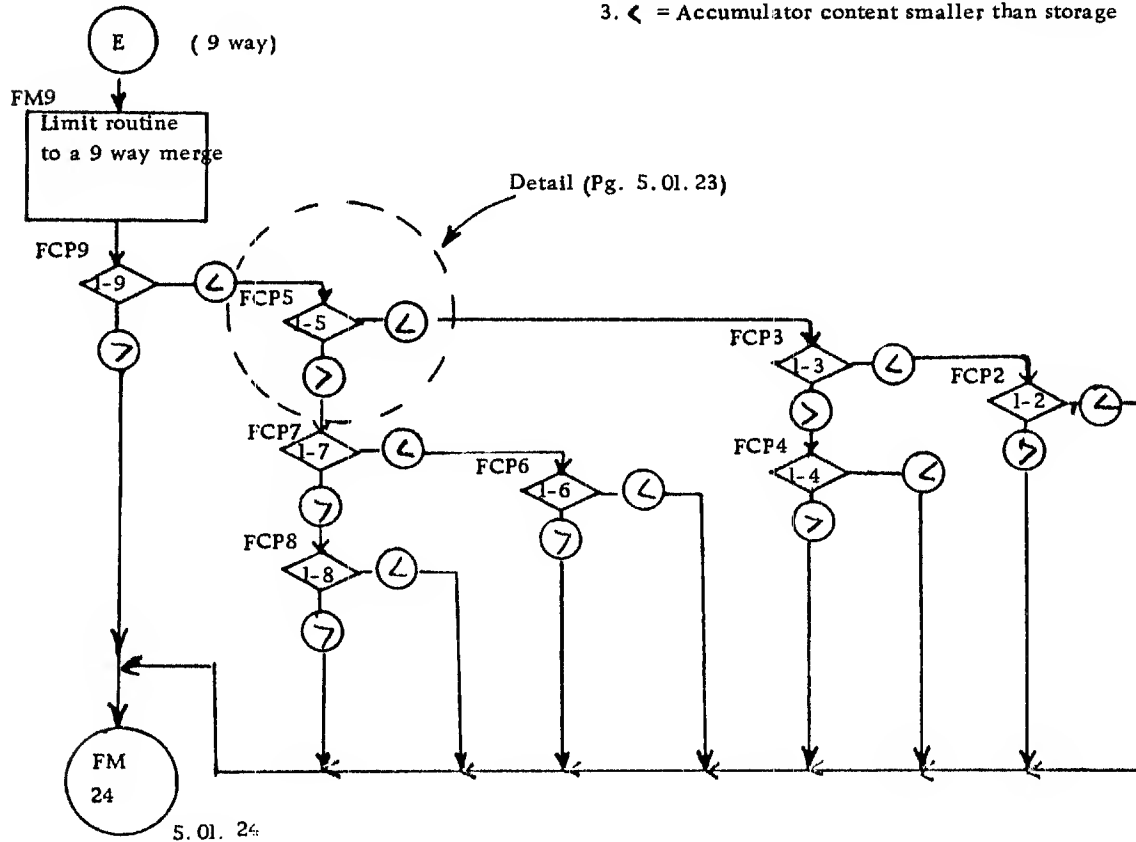
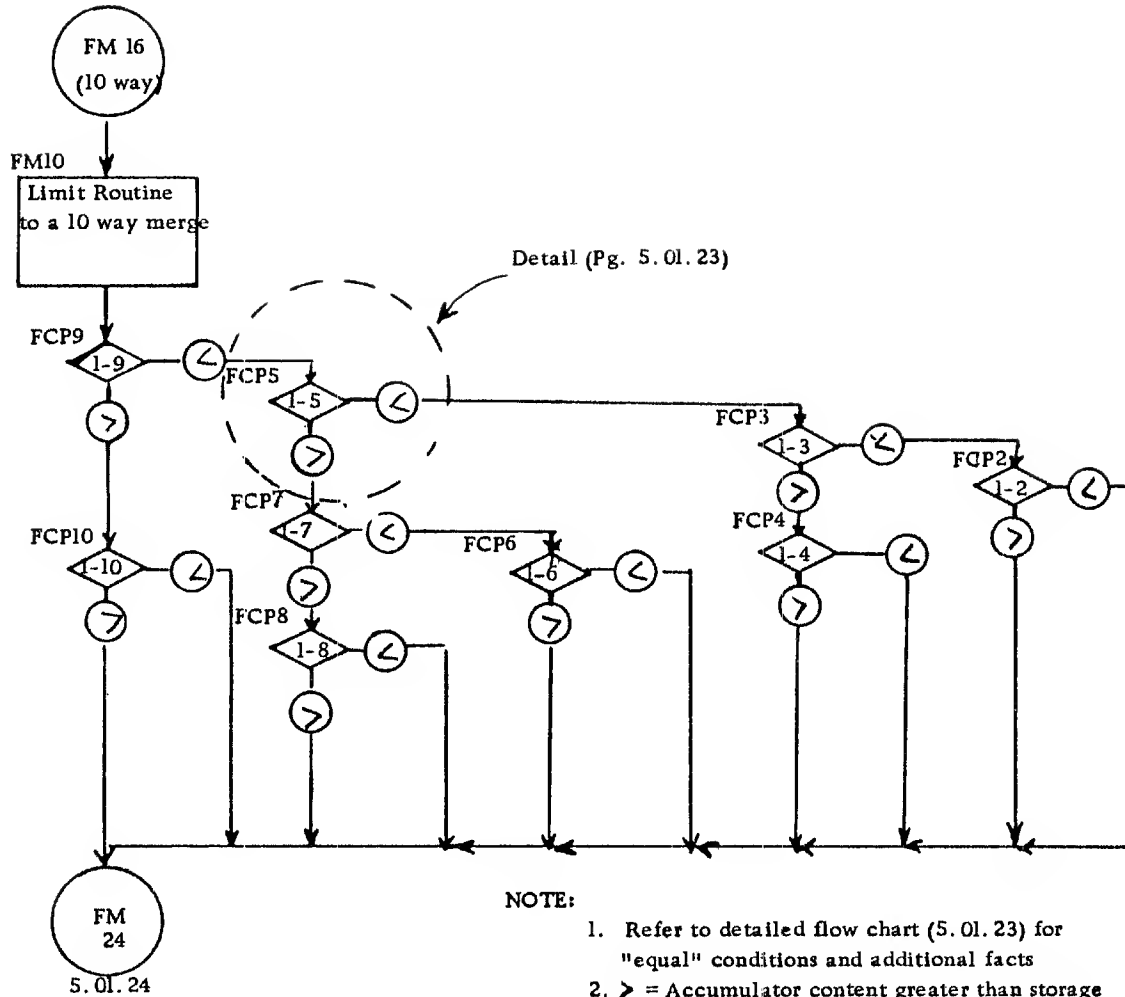


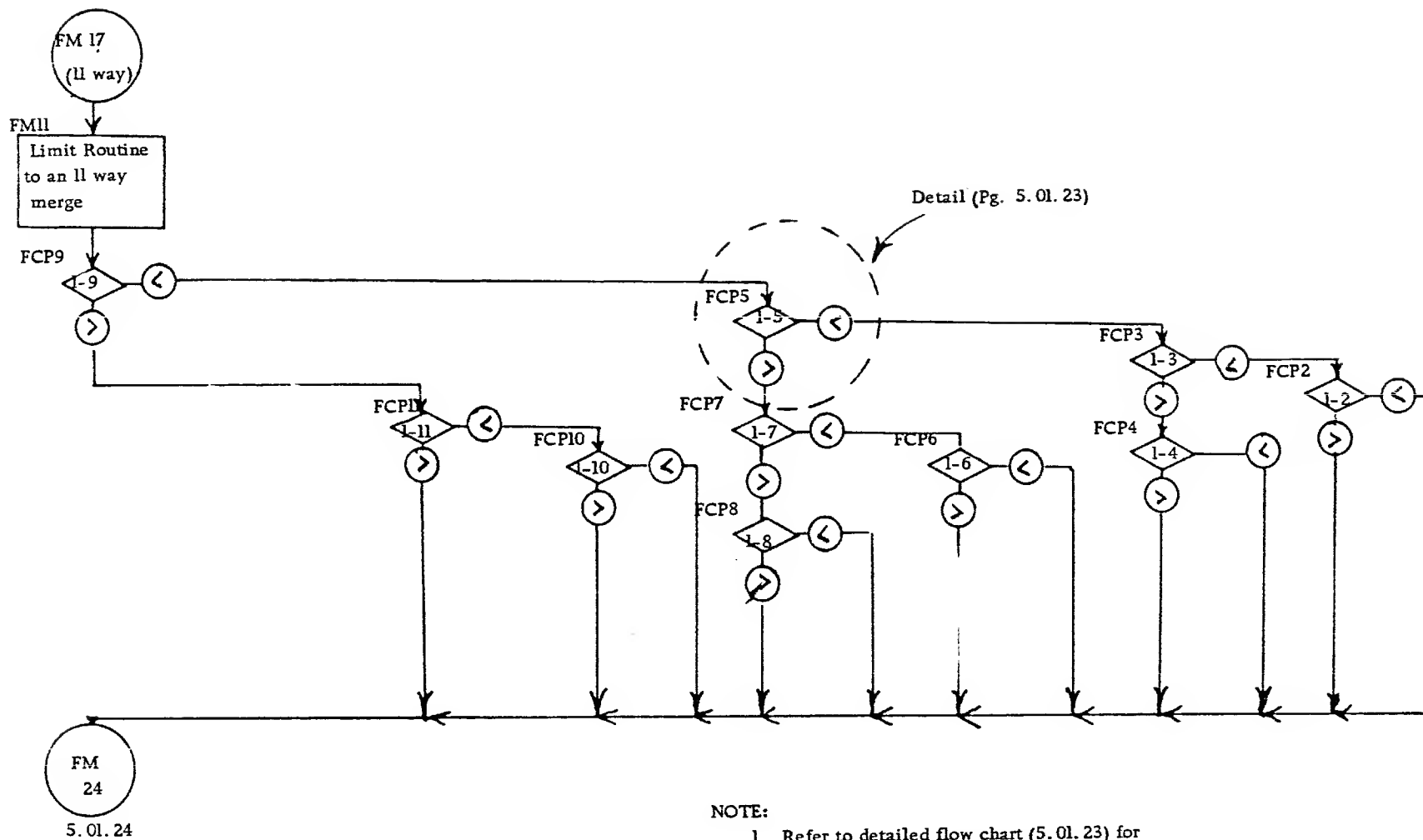


## NOTE:

1. Refer to detailed flow chart (5. 01. 23) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

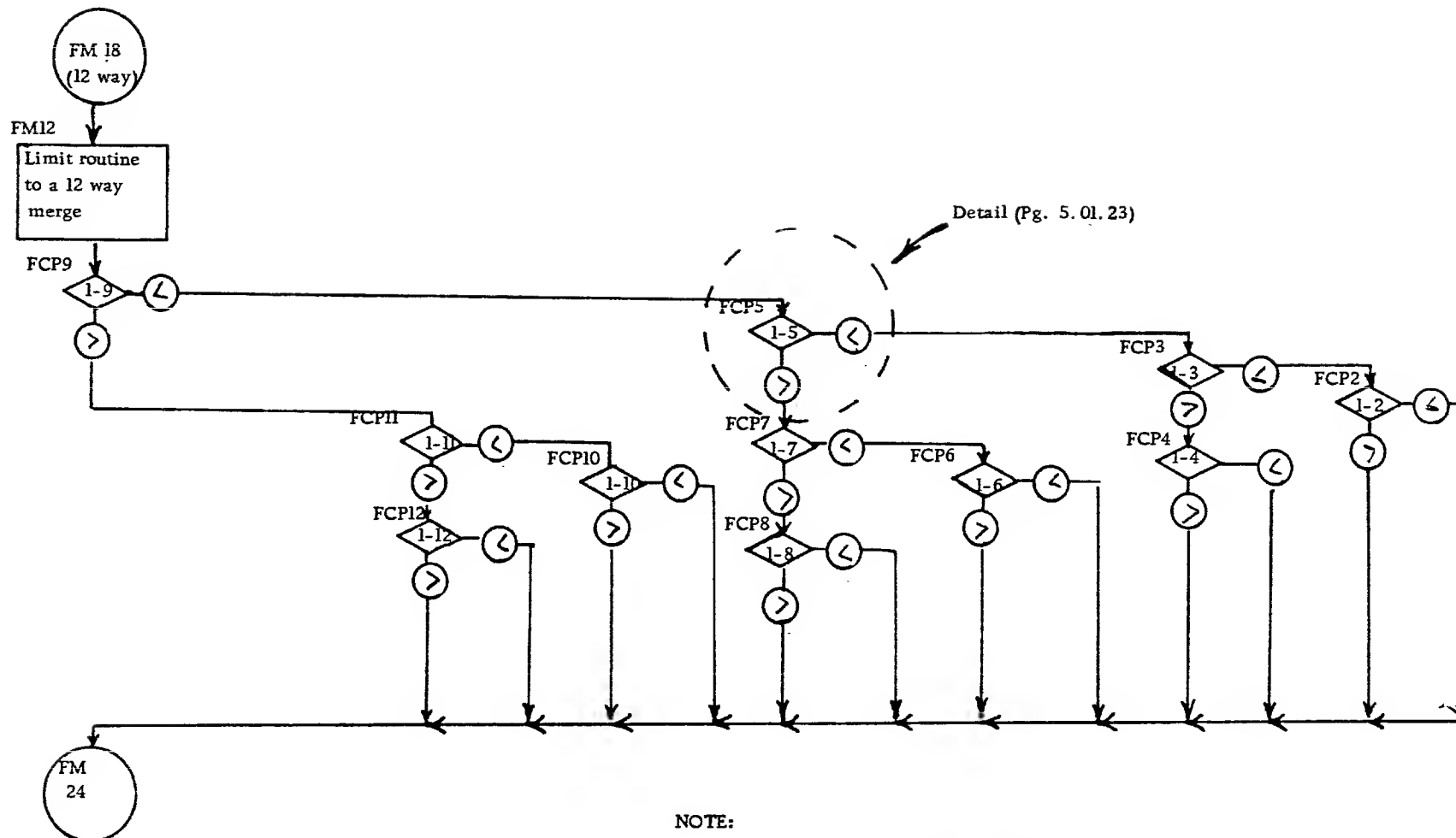






NOTE:

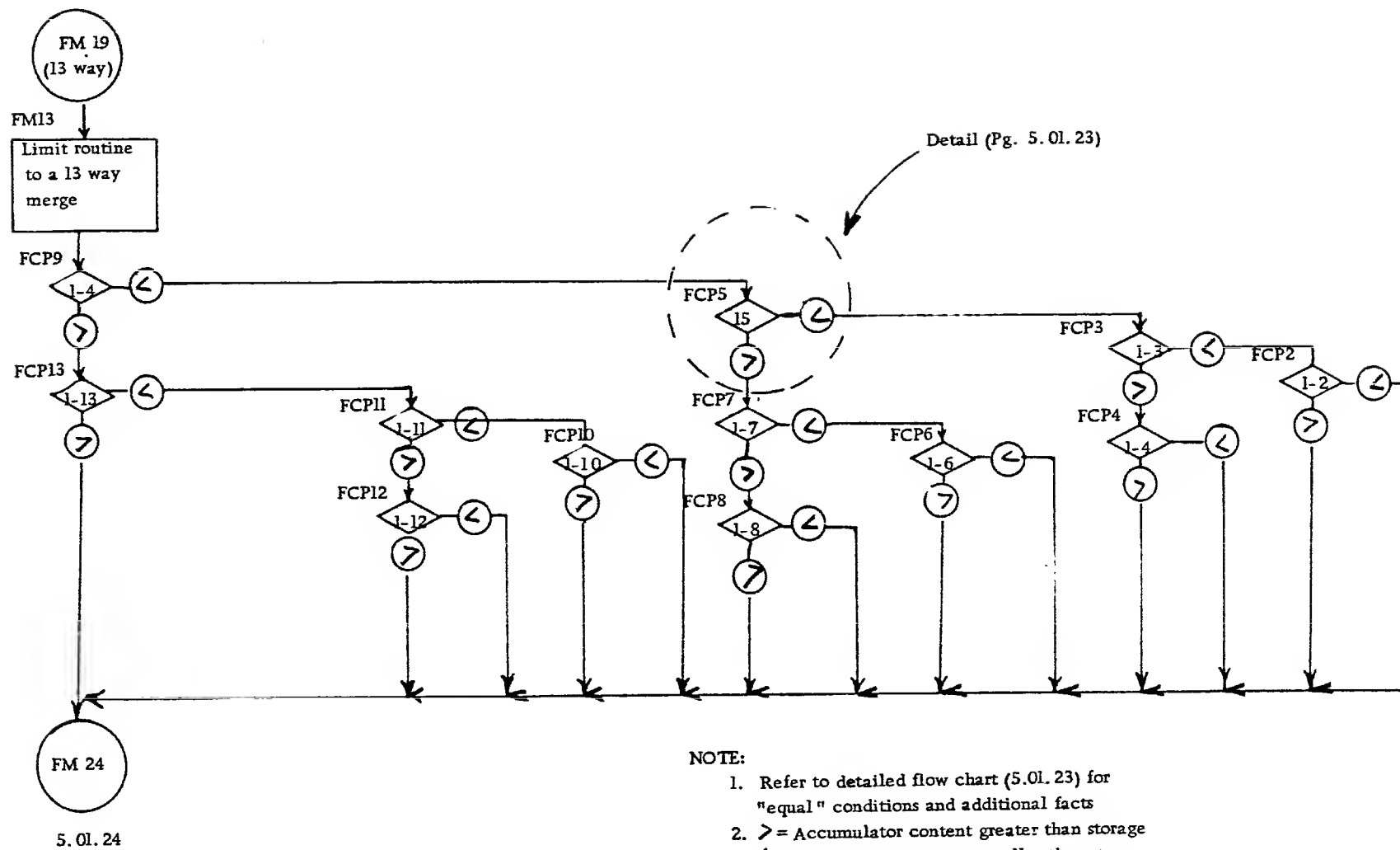
1. Refer to detailed flow chart (5.01.23) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

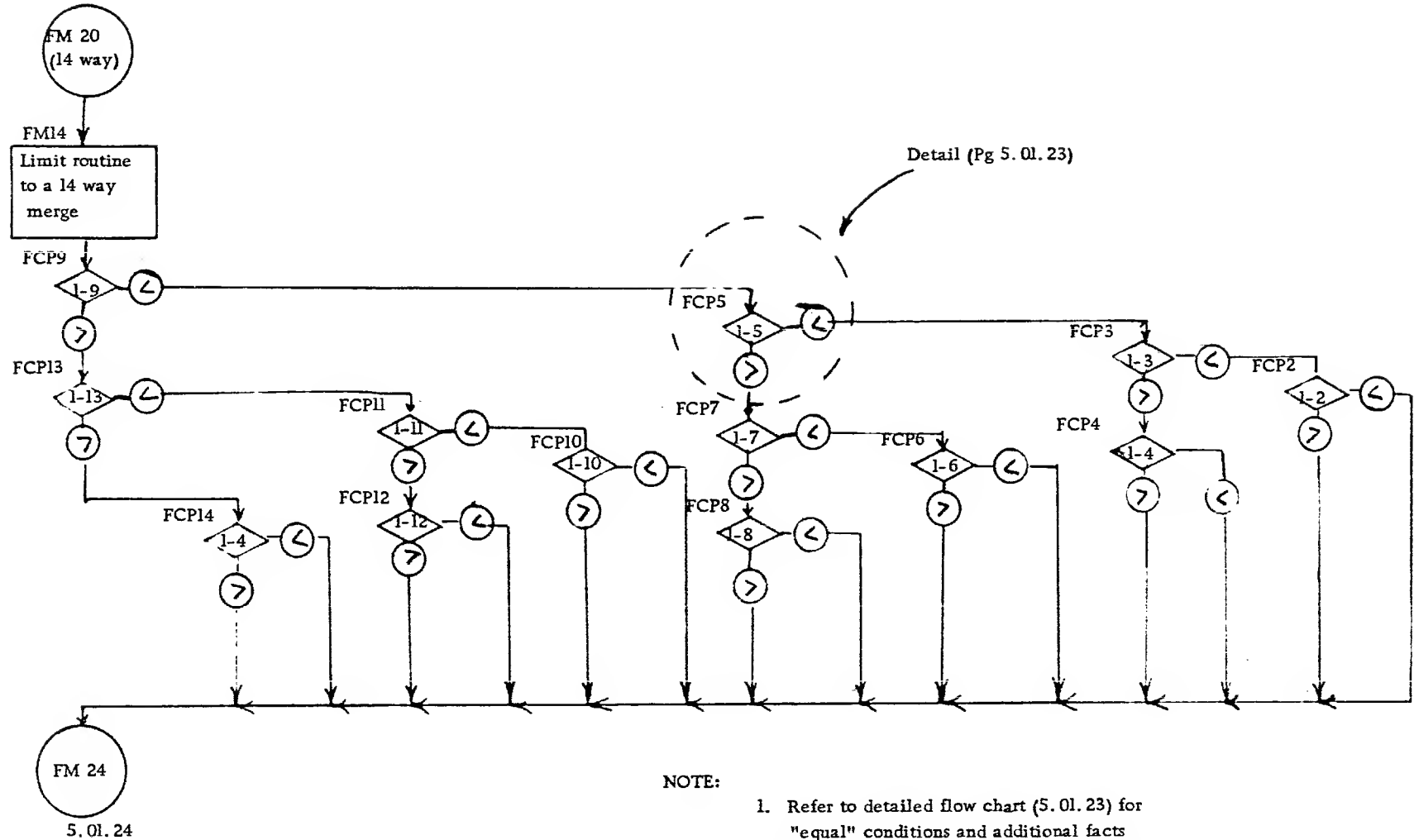


5. 01. 24

NOTE:

1. Refer to detailed flow chart (5. 01. 23) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

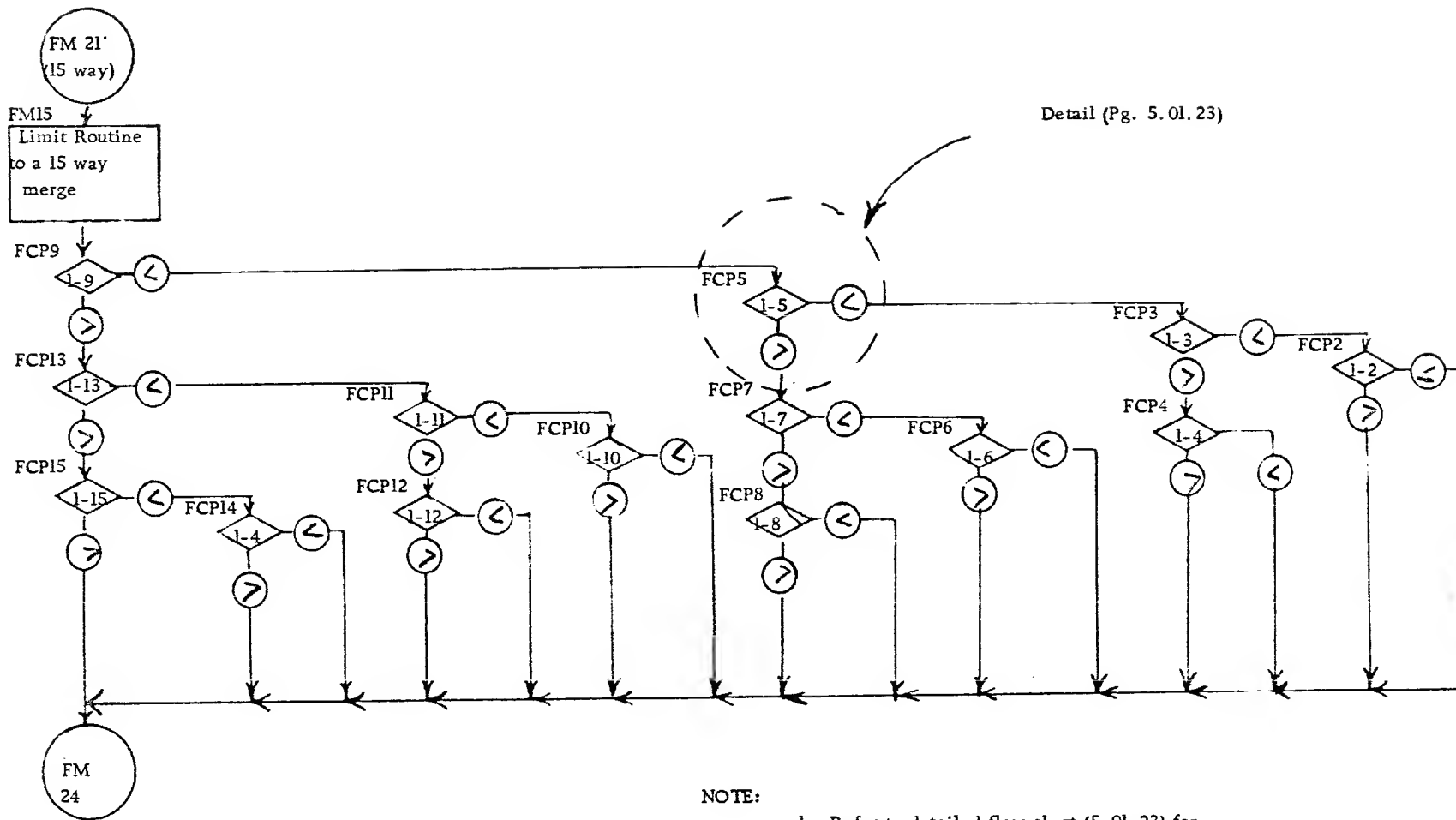




NOTE:

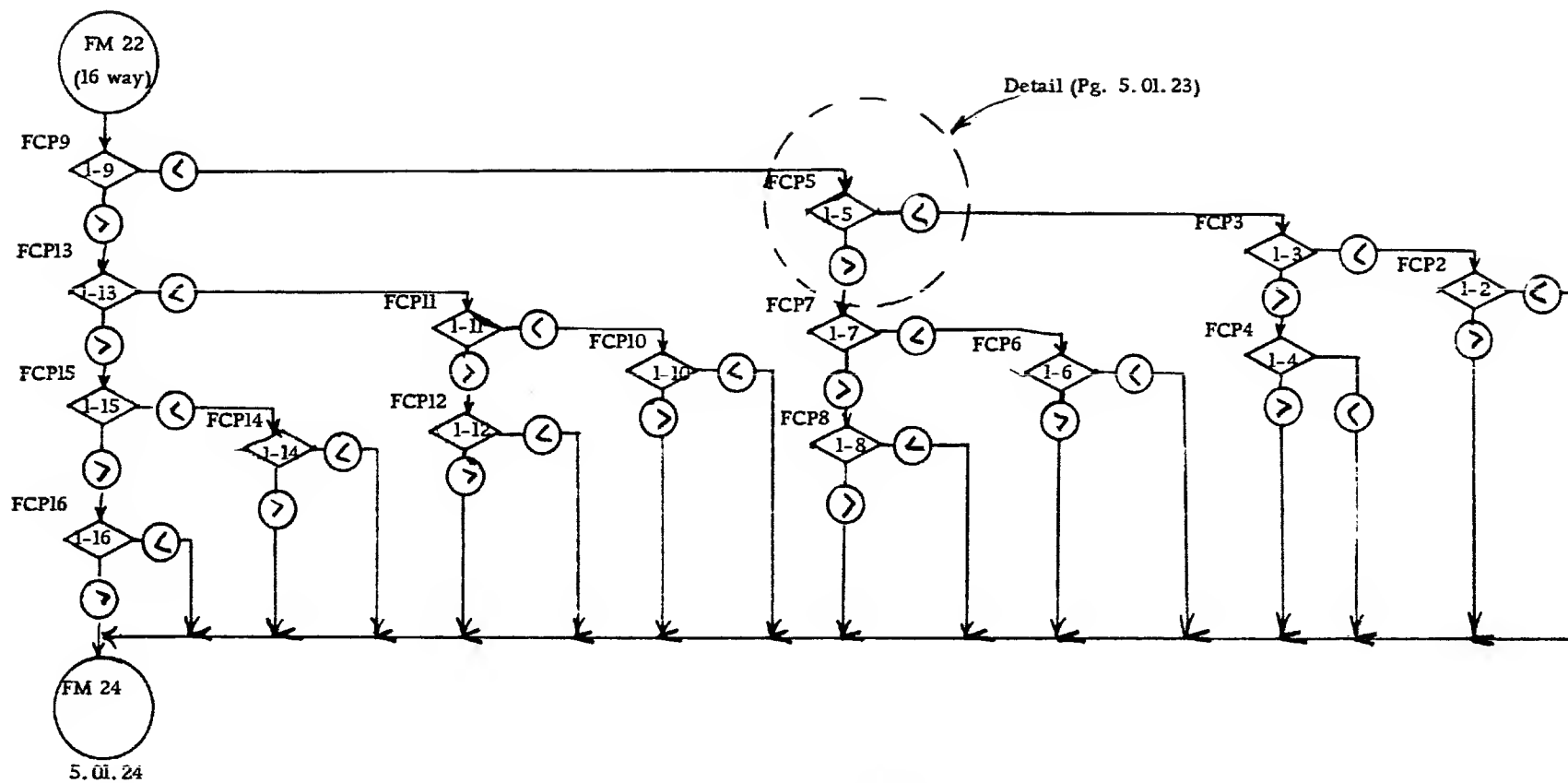
1. Refer to detailed flow chart (5. 01. 23) for "equal" conditions and additional facts
2. >: Accumulator content greater than storage
3. <: Accumulator content smaller than storage





NOTE:

1. Refer to detailed flow chart (5.01.23) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

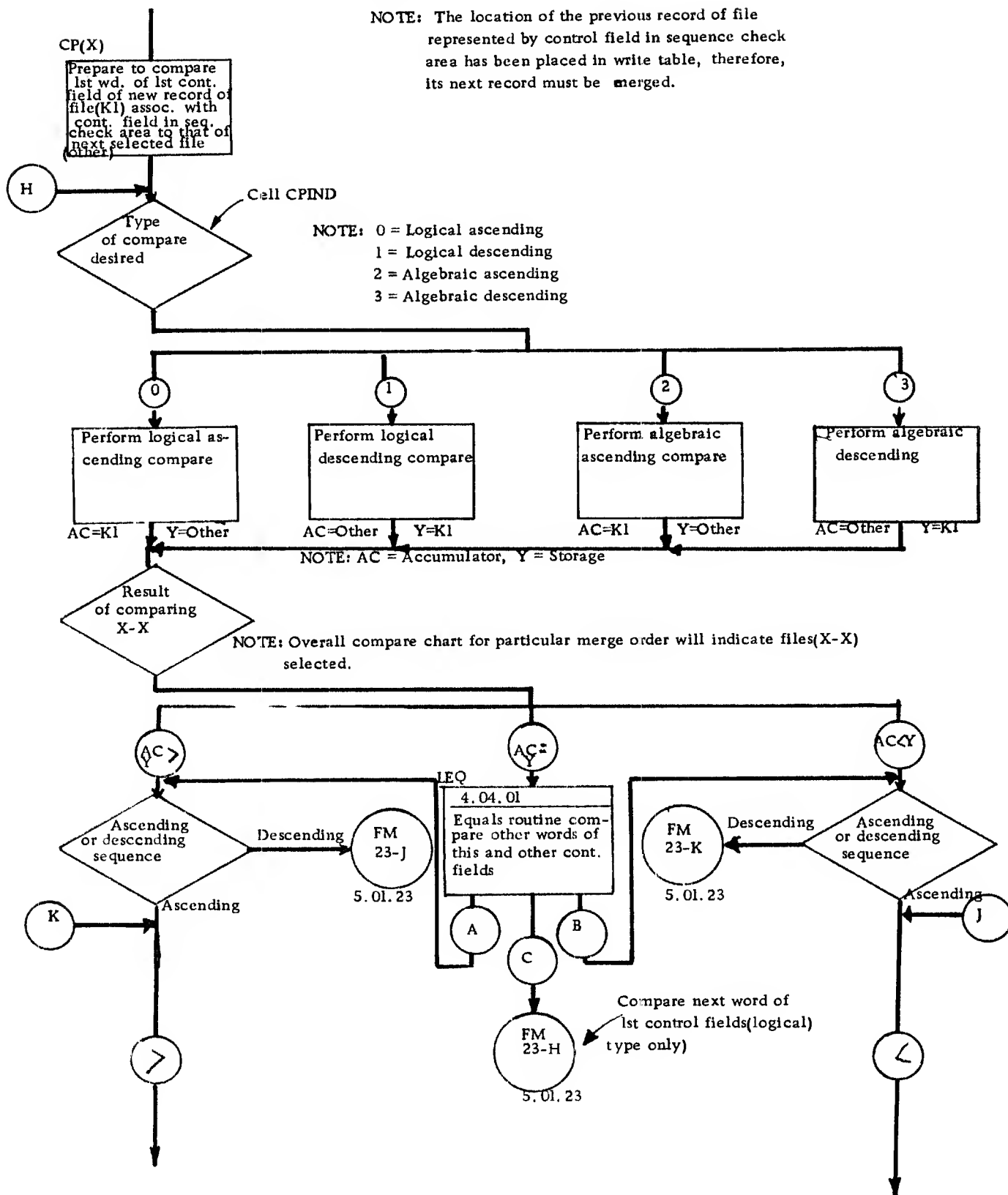


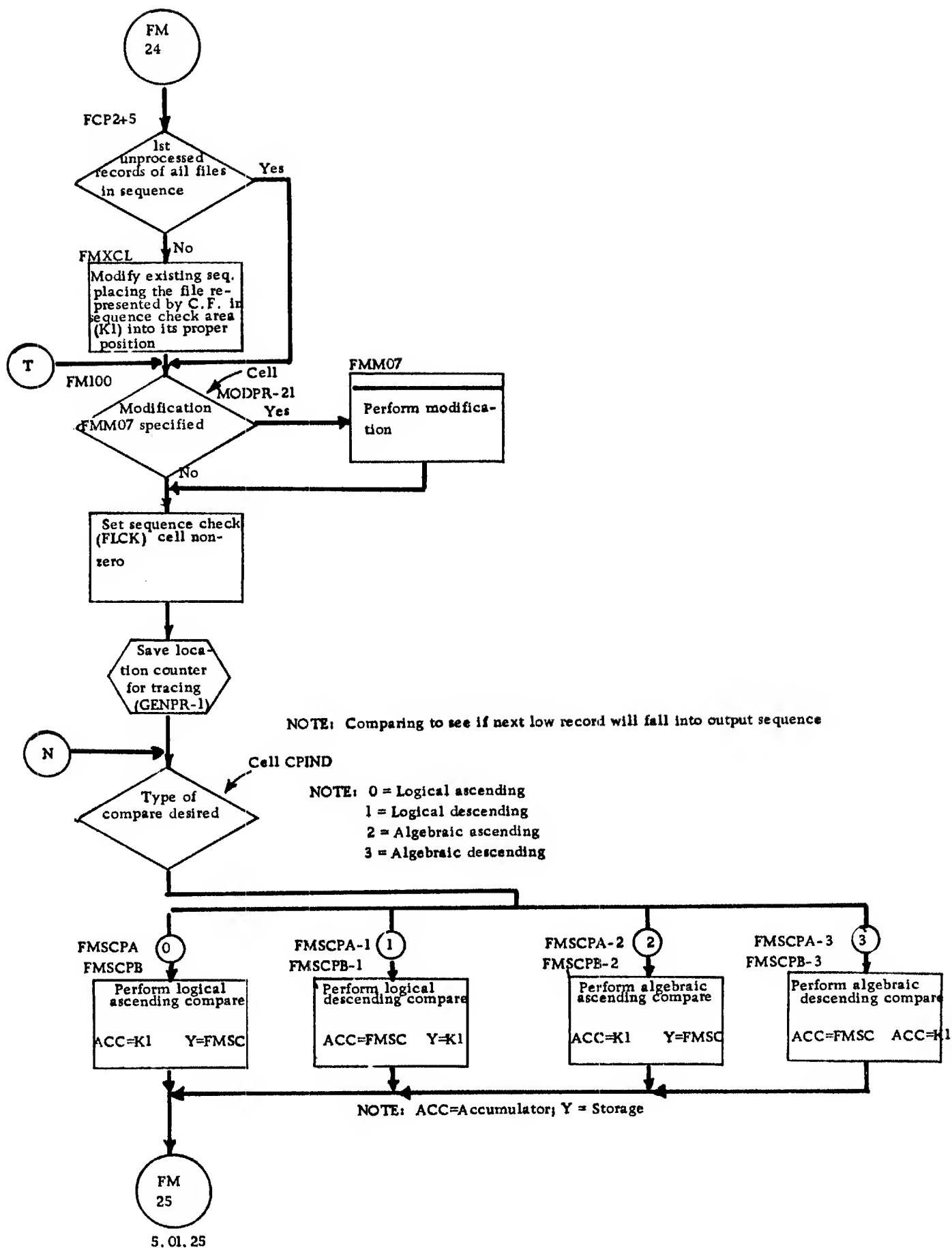
**NOTE:**

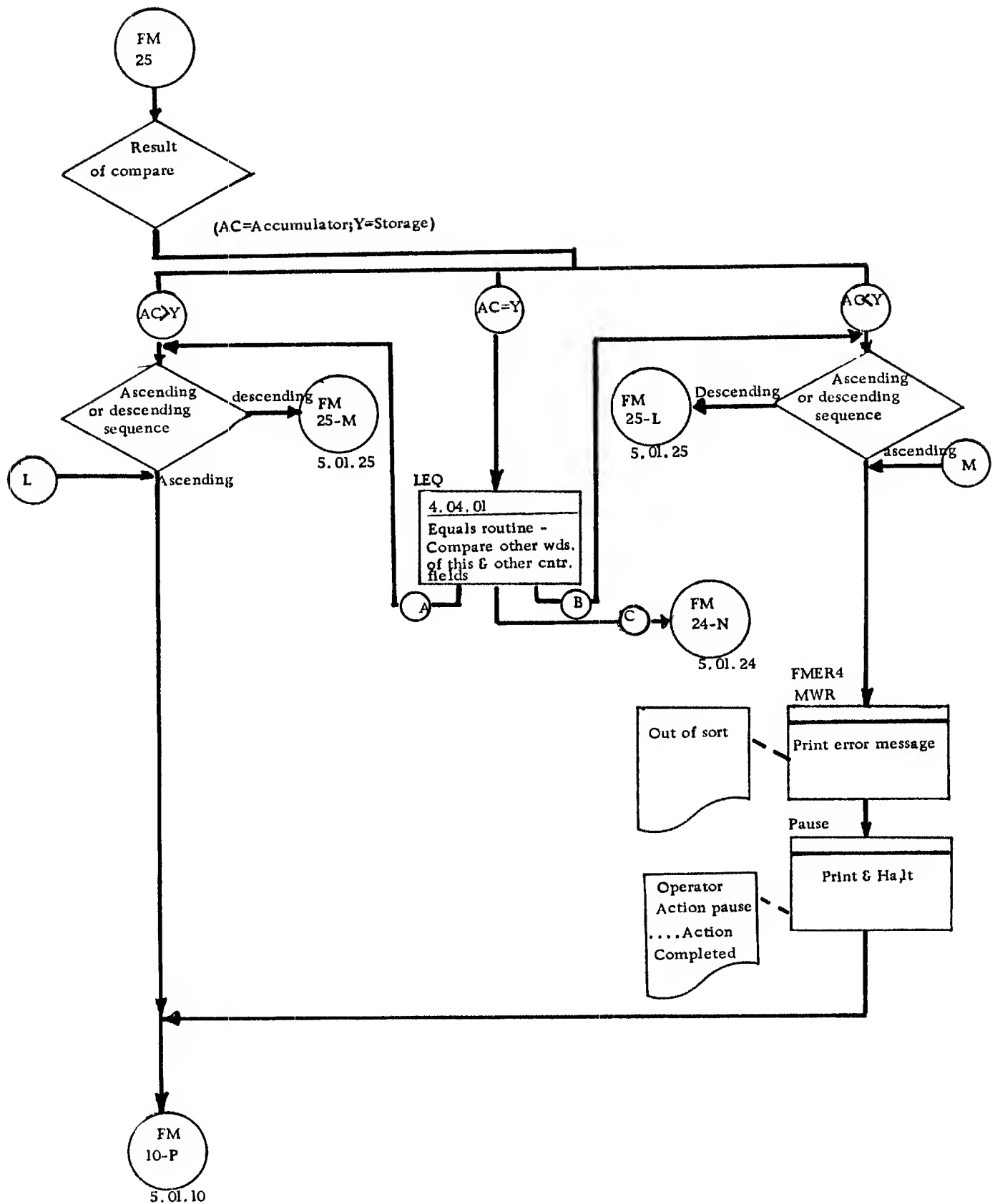
1. Refer to detailed flow chart (5.01.23) for "equal" conditions and additional facts
2. > = Accumulator content greater than storage
3. < = Accumulator content smaller than storage

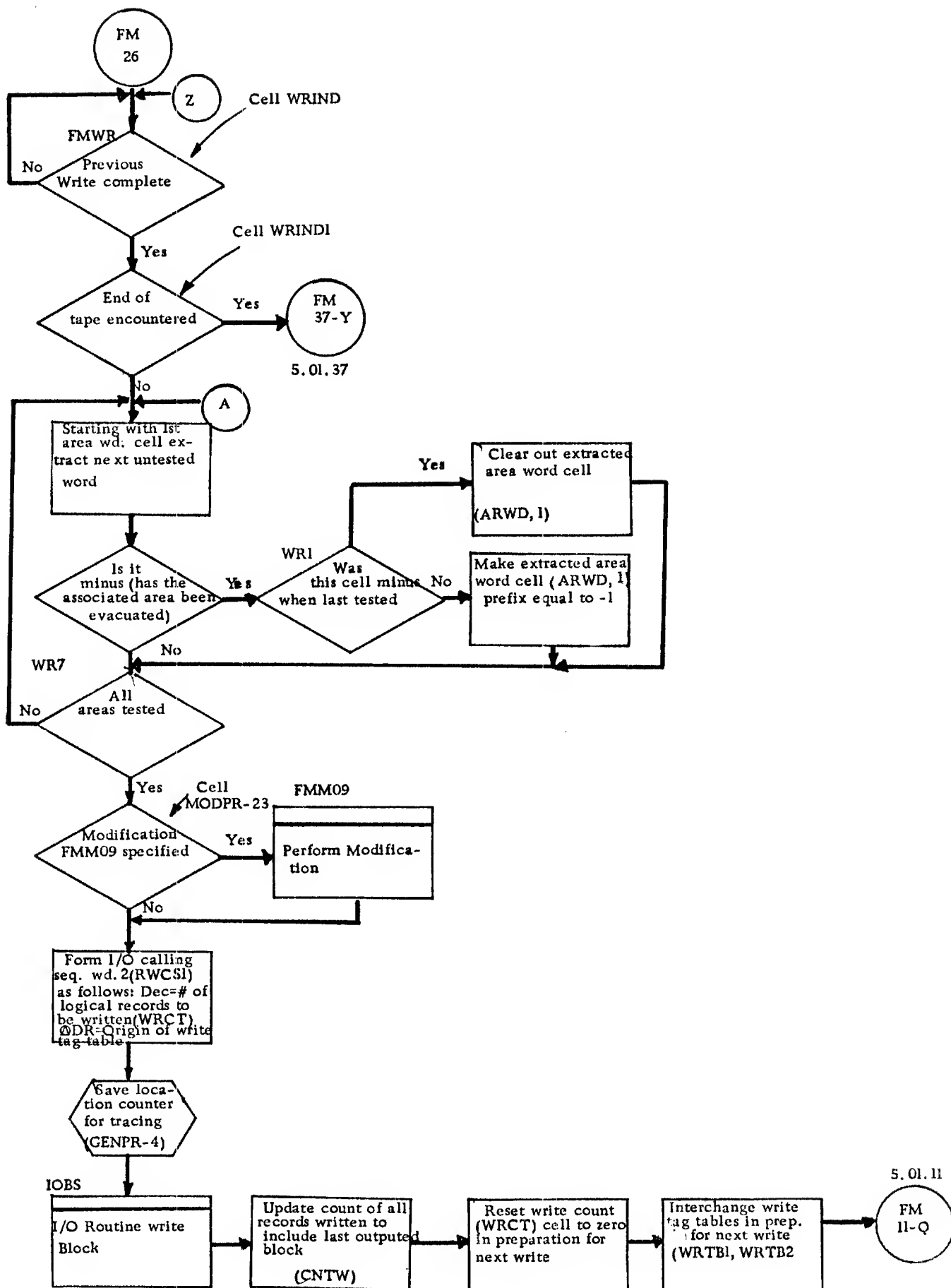
DETAIL OF COMPARE OPERATIONS  
(Refer to pages 5.01.13 - 5.01.22)

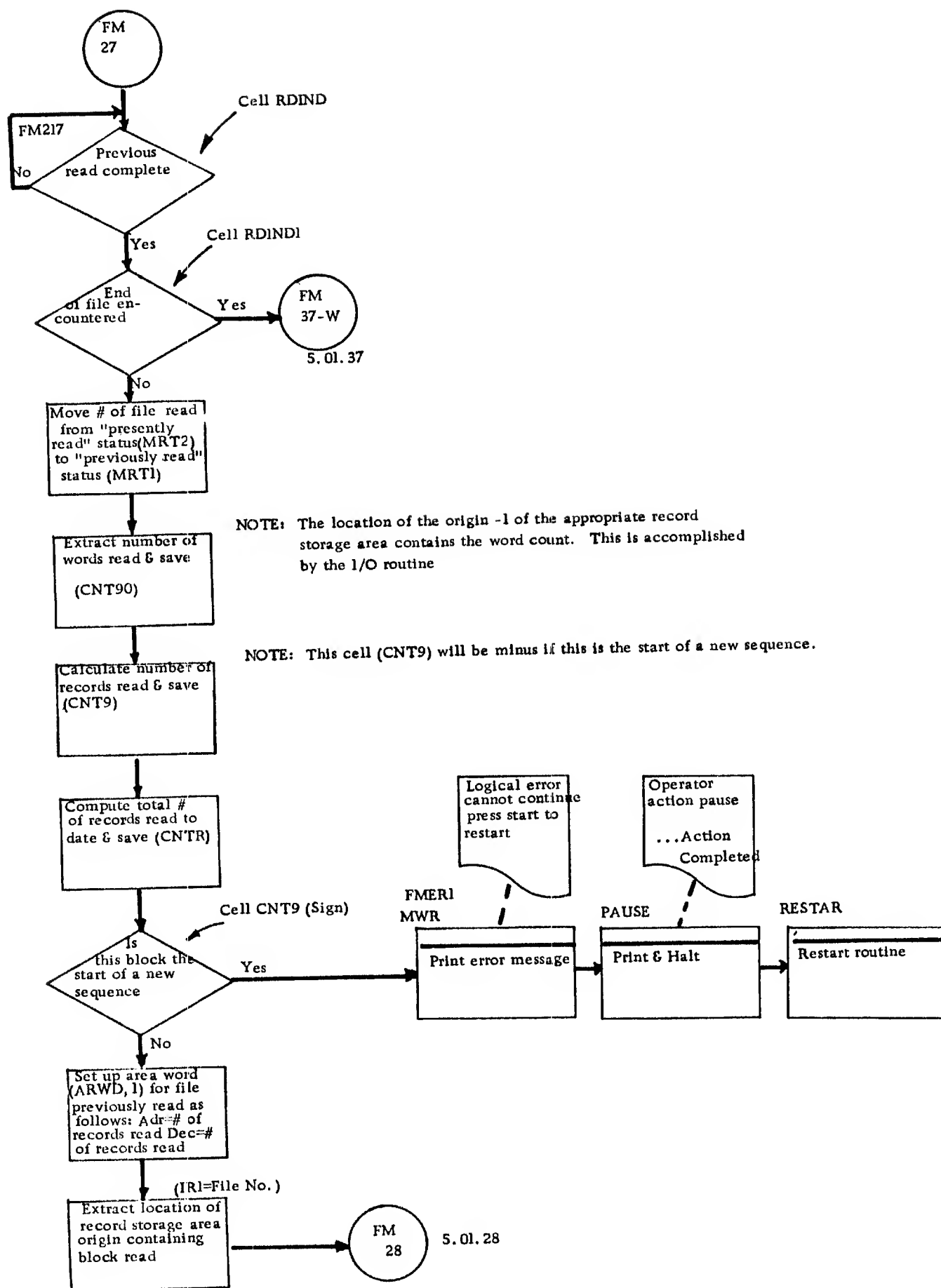
NOTE: The location of the previous record of file represented by control field in sequence check area has been placed in write table, therefore, its next record must be merged.

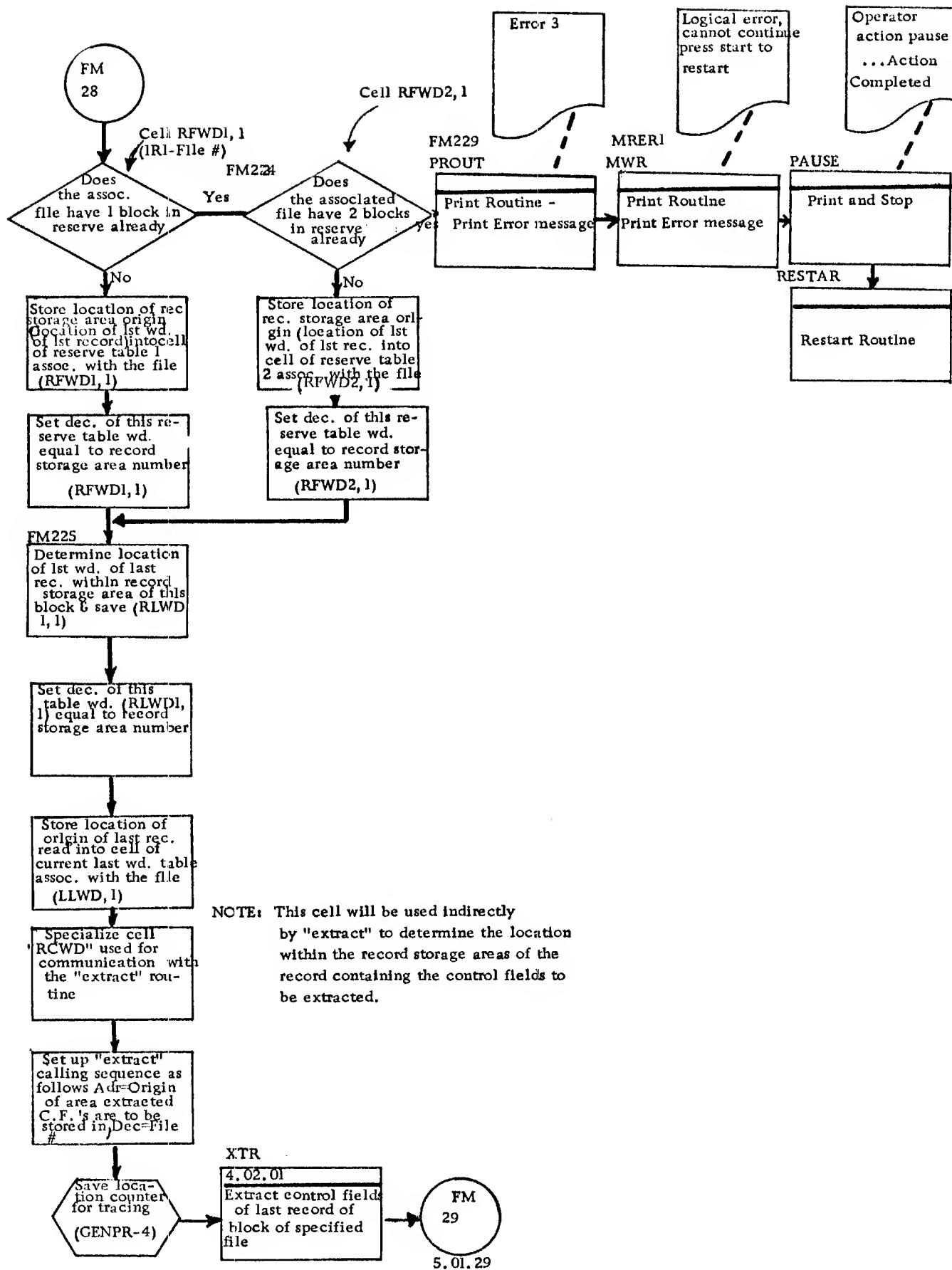




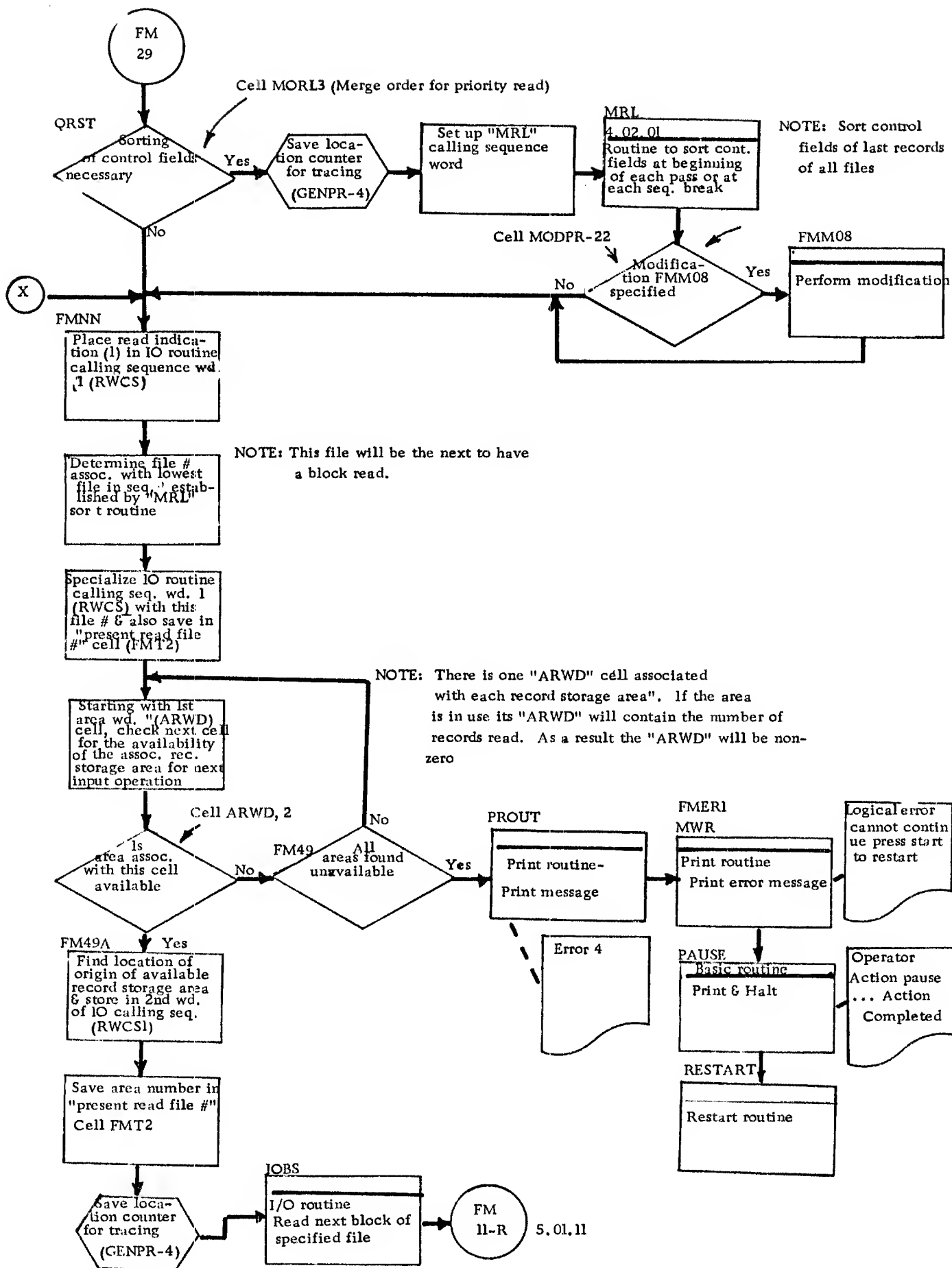


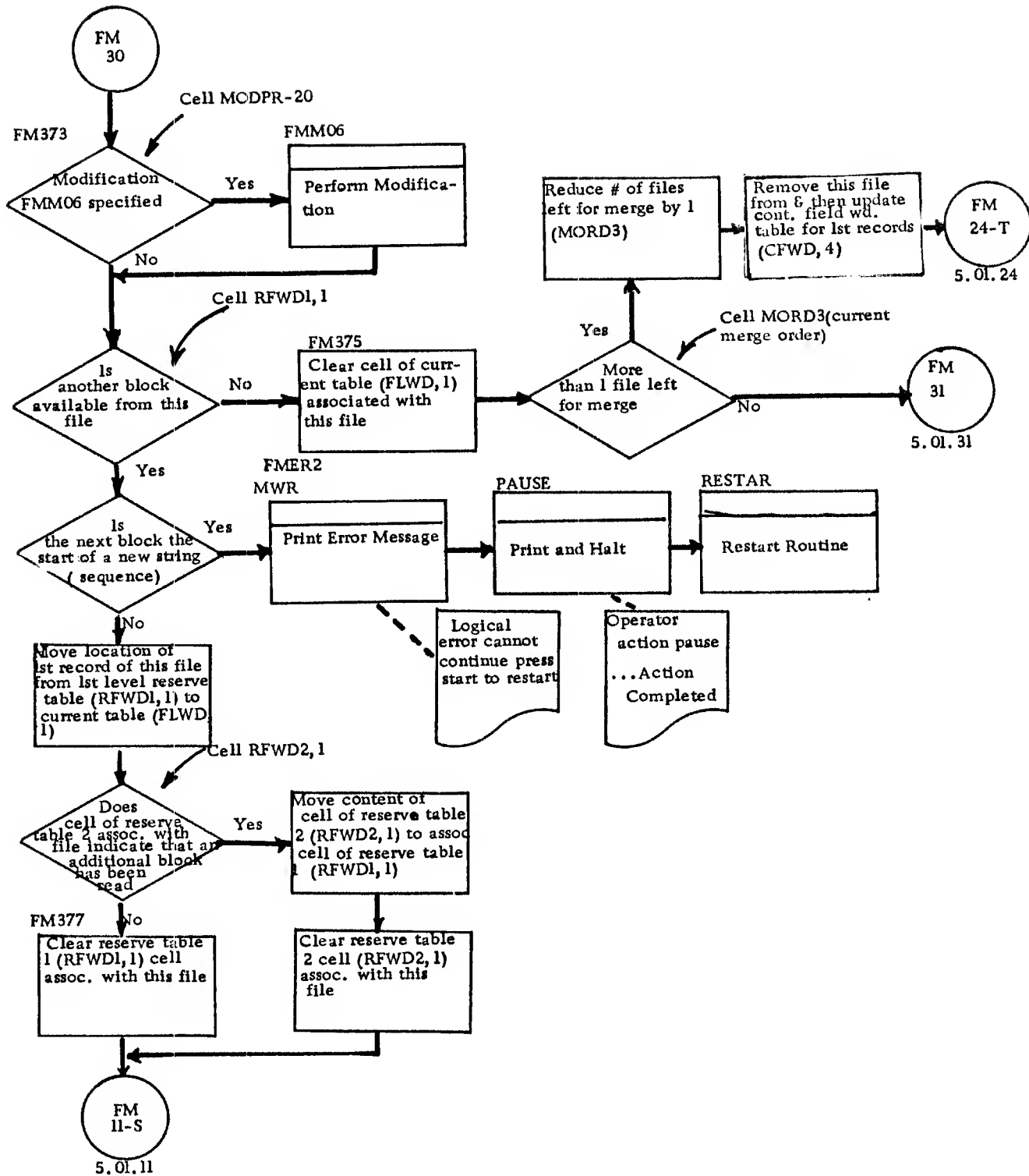


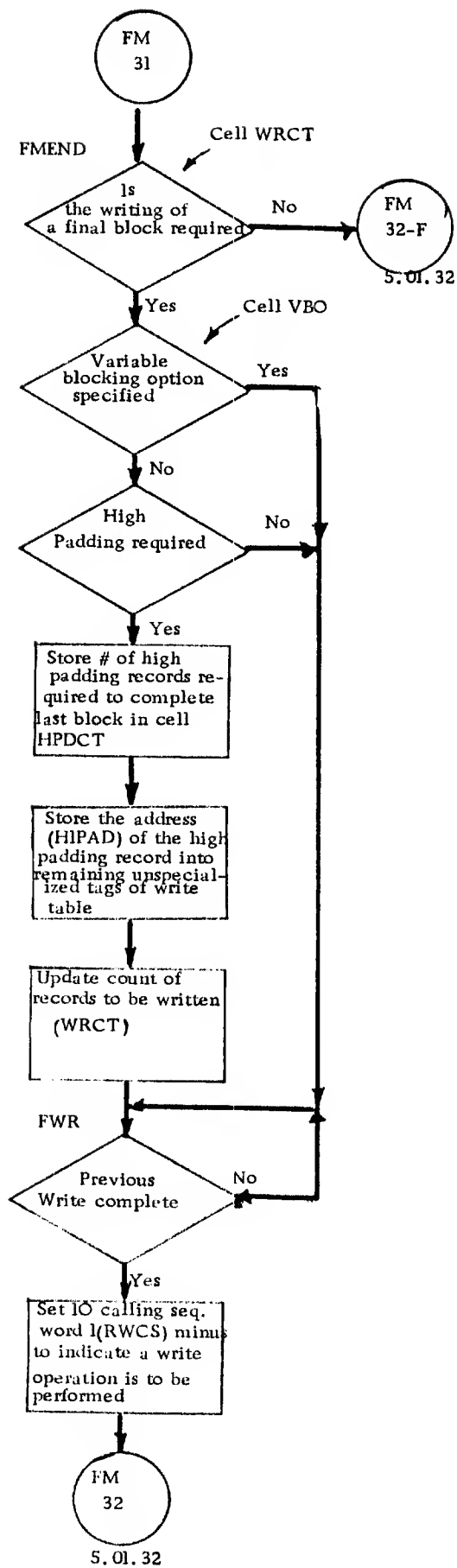


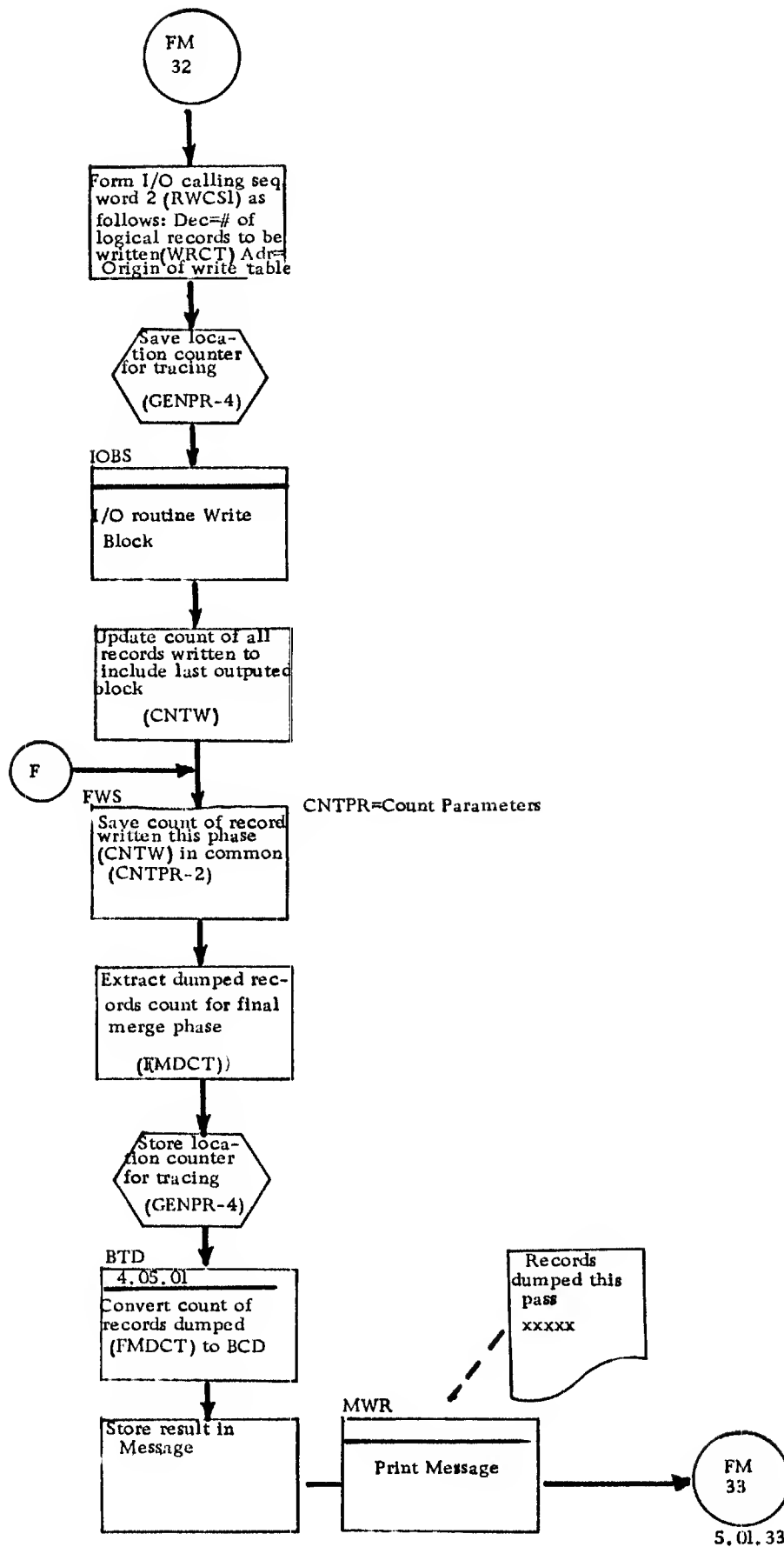


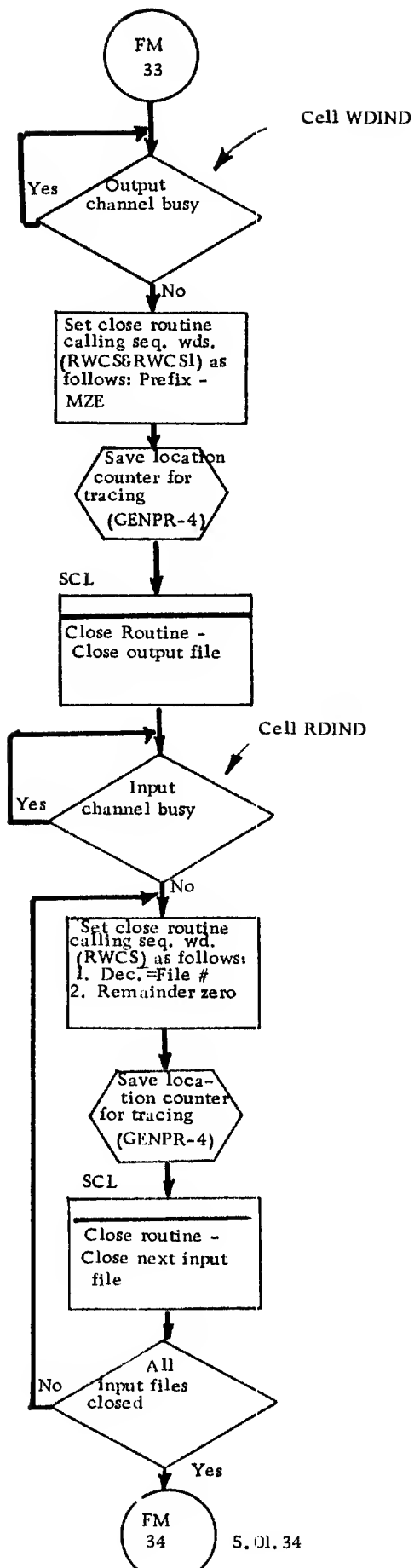


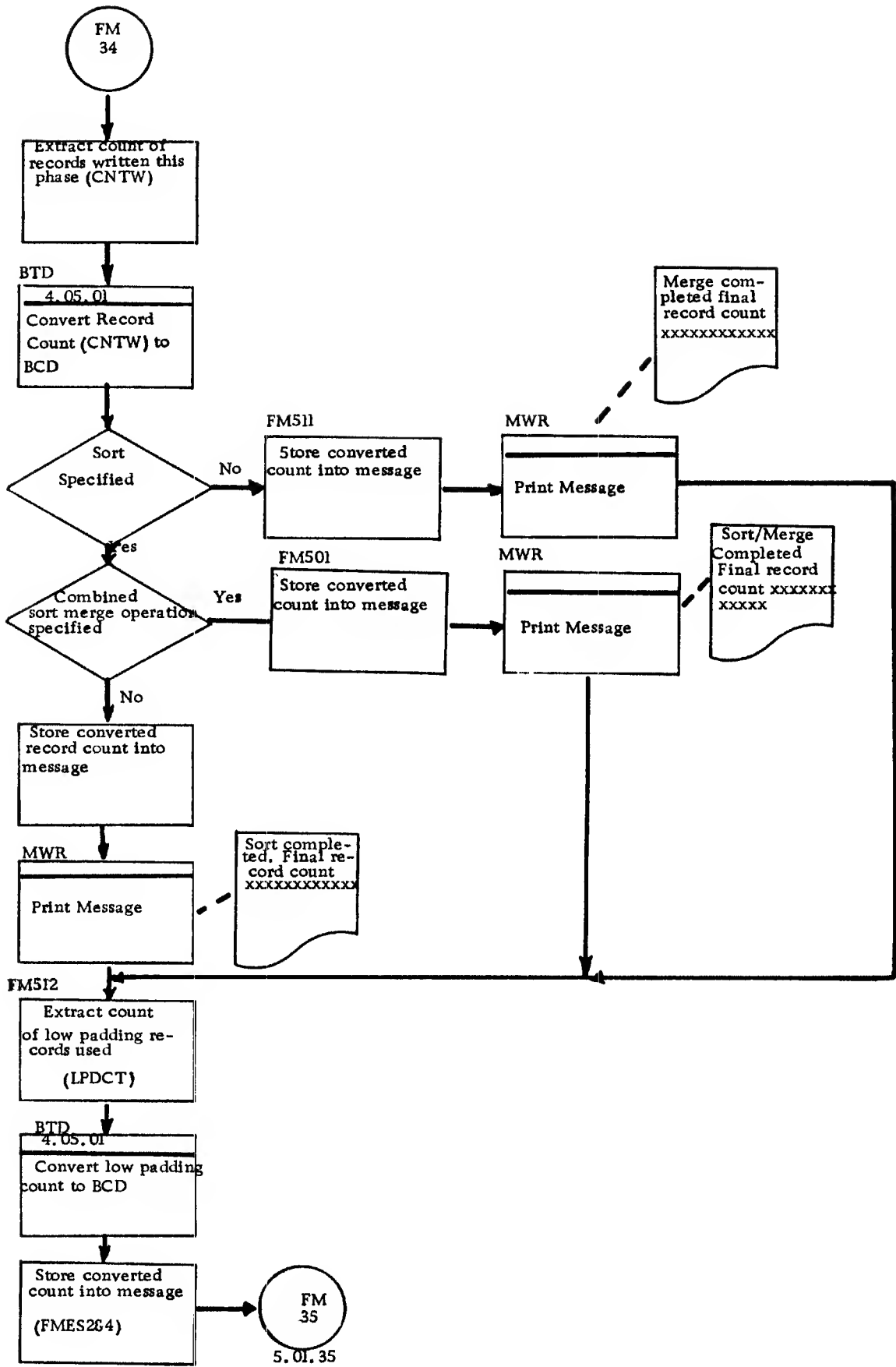


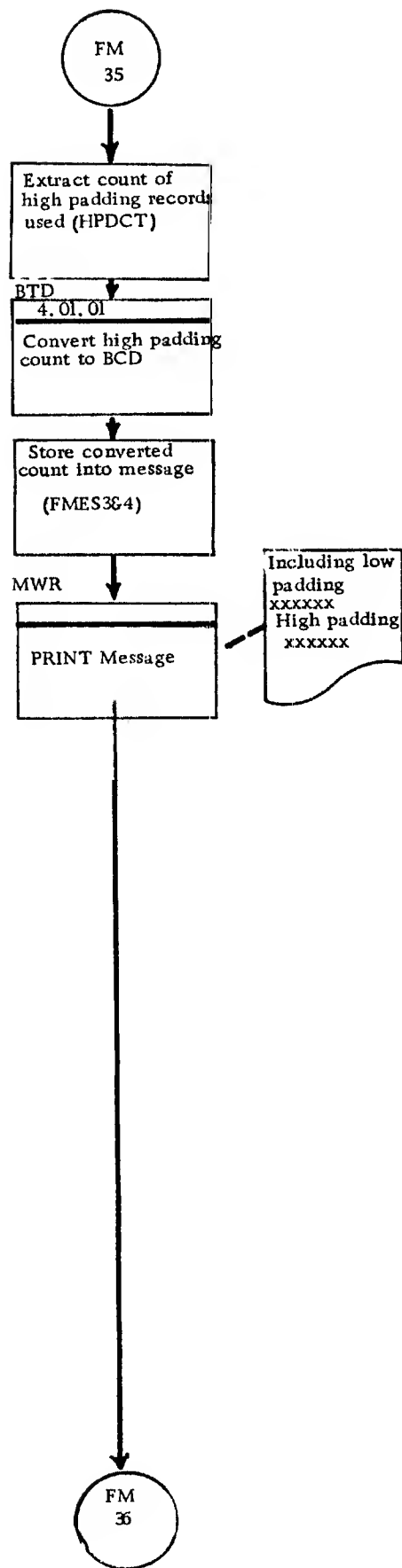


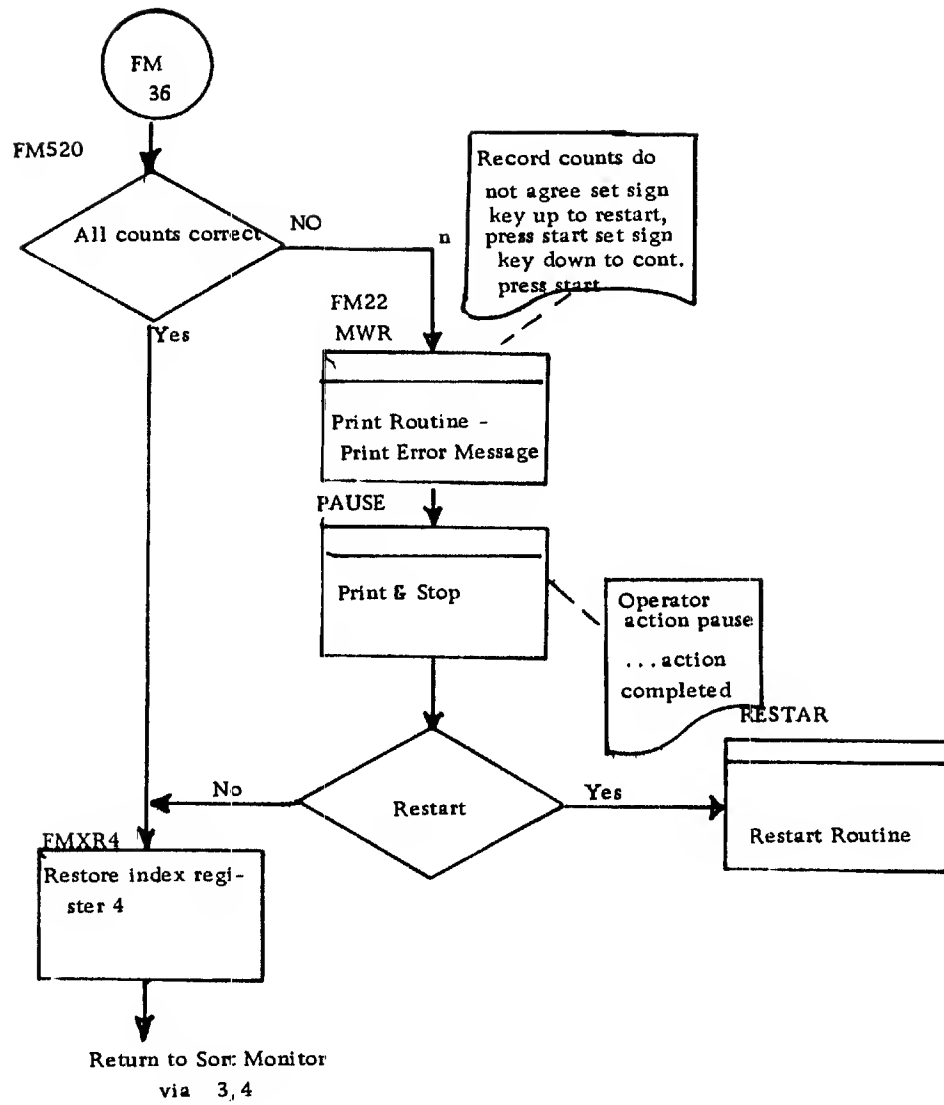




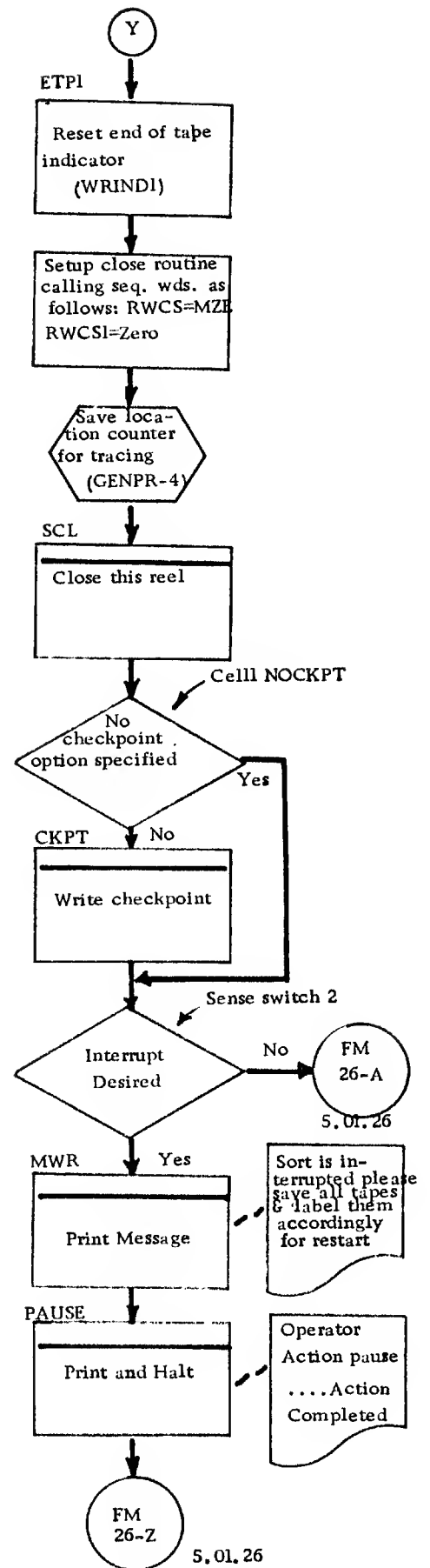
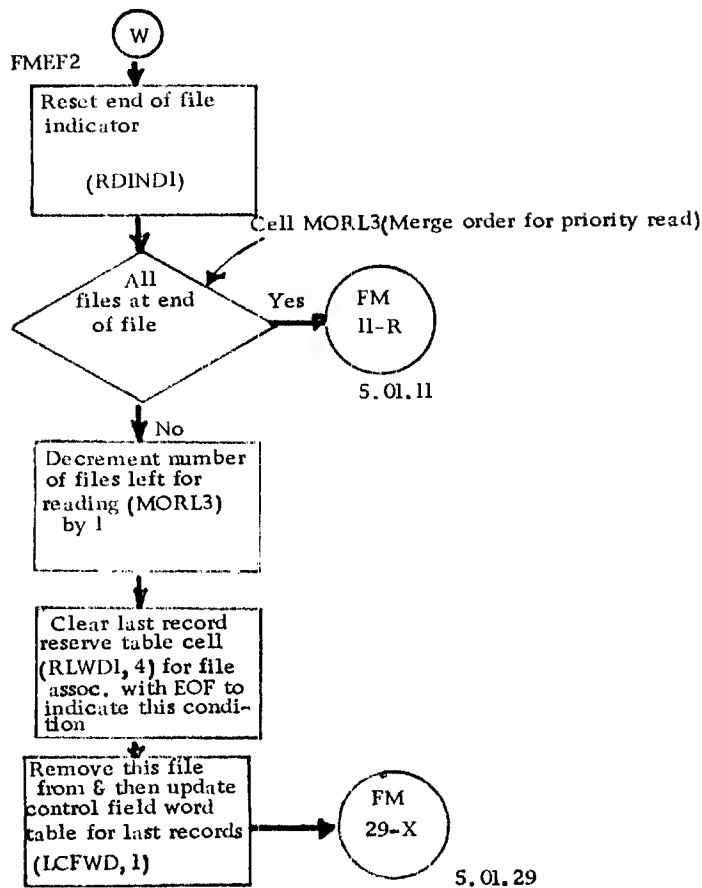
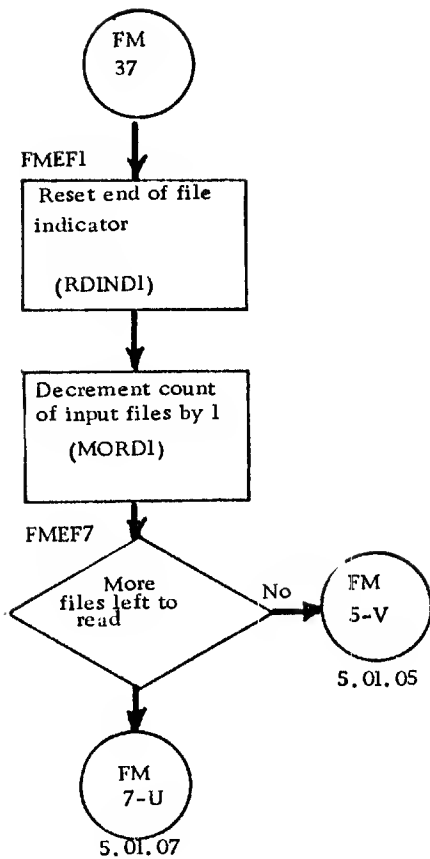


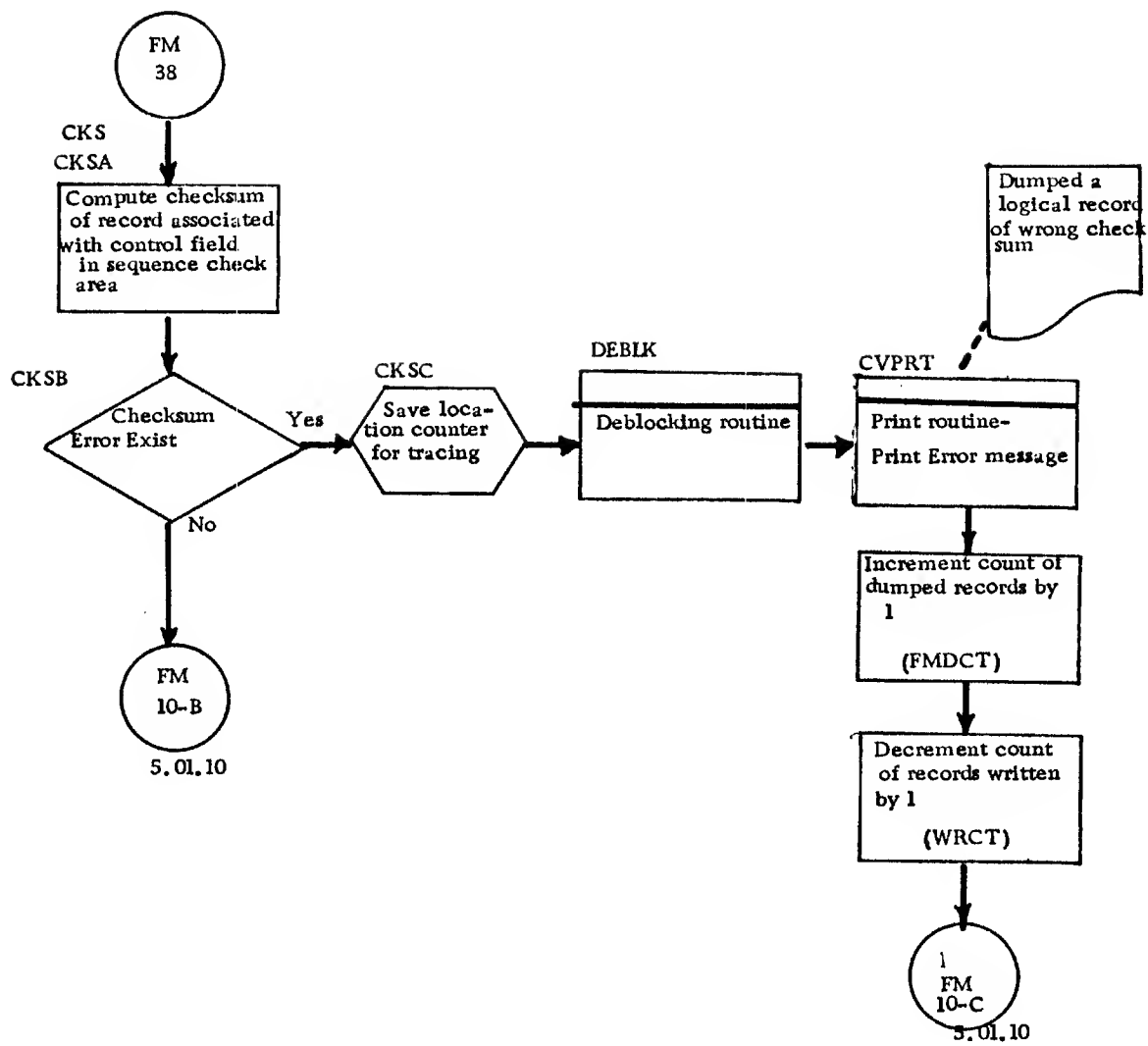


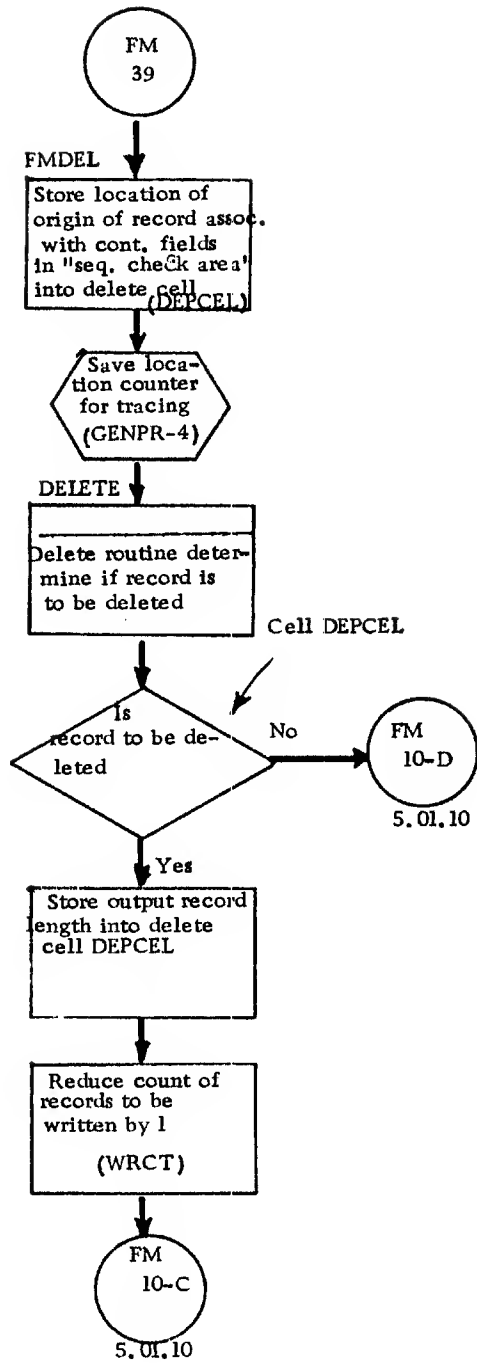


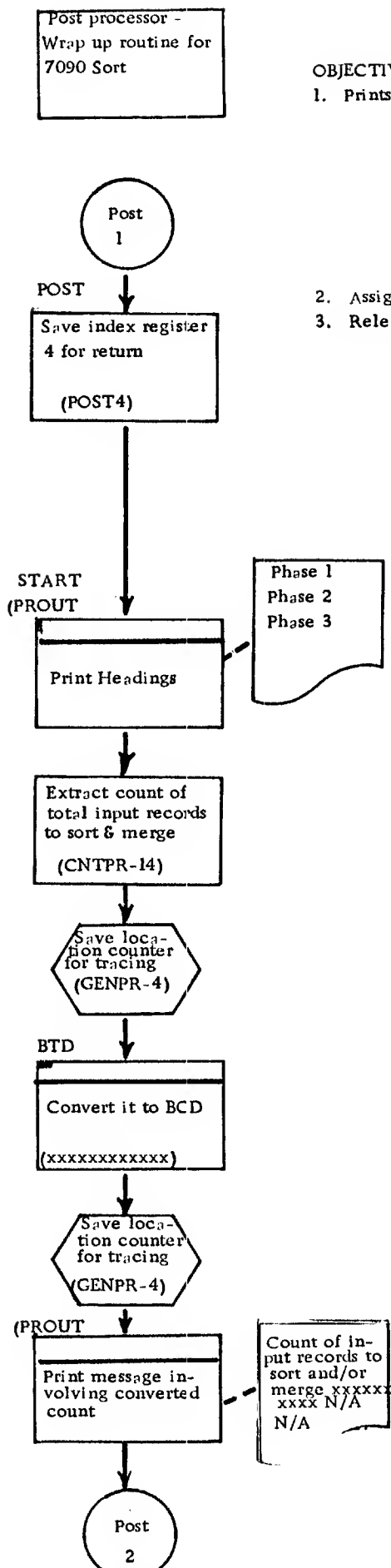












## OBJECTIVES:

## 1. Prints

- A. Count of input records to sort or merge
- B. Count of records sorted or merged
- C. Count of records dumped
- D. Count of records deleted
- E. Count of high padding records in final output  
or
- F. Count of low padding records in final output

## 2. Assigns all intersystem tapes

## 3. Releases all other tapes assigned for sorting

